V01458

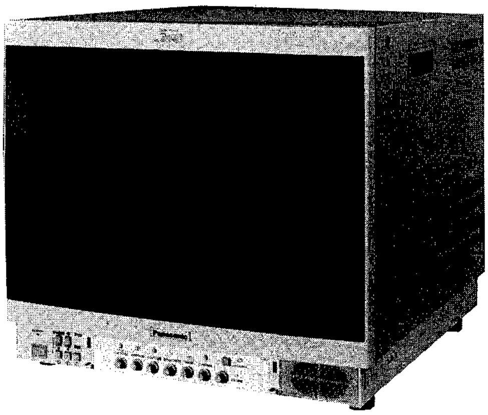
ORDER NO. VED9405190C2

Service Manual

Colour Video Modical Monitor

MT-M2080

Chassis No. G16M



The service technician is required to read and follow the "Safety Precautions" and "Important Safety Notice" in this service manual.

Specifications

Power Source:	AC220-240V 50/60Hz
Power Consumption:	1.0A
Picture Tube:	20″ diagonal 90-degree deflection 0.40mm Dot Pitch
Speaker Output:	1.5W

Video/Audio Terminals: (LINE A/LINE B)

Video Input;	1.0Vp-p, 75Ω or HIGH impedance (Auto), BNC type connector
Video Through Out;	Automatic Termination Opener, BNC type connector
Audio Input;	0.5Vrms, 22kΩ or more, phono type connector
Audio Through Out;	Phono type connector
S-Video Input;	Y signal 1.0Vp-p, C signal 0.285Vp-p, 75Ω or HIGH impedance (Manual), MINI DIN 4P type connector
S-Video Output;	Y signal 1.0Vp-p, C signal 0.285Vp-p, 75Ω or HIGH impedance (Manual), MINI DIN 4P type connector

ROB Terminals:	R;	0.7Vp-p±2dB 75Ω with automatic loop-through output BNC type connector (2)
	G;	0.7Vp-p±2dB 75Ω with automatic loop-through output BNC type connector (2)
	B;	0.7Vp-p±2dB 75Ω with automatic loop-through output BNC type connector (2)
	Sync;	4.0Vp-p$^{+6}_{-26}$ dB negative, 75Ω with automatic loop-through output, BNC type connector (2)
Resolution:	more than 700 TV lines (Horizontal)	
Colour Temperature:	6500K	

Panasonic

Dimensions:	
Width	448mm (17-11⁄16 inches)
Depth	532mm (21 inches)
Height	414mm (16-5⁄16 inches)
Weight:	27.5kg
Operating Temperature:	32°F~104°F (0°C~+40°C)
Operating Humidity:	30%~85%
Accessory:	AC Power cord Front cover Rack Mount Handle Screw for Rack Mount Handle

Specifications are subject to change without notice.
Weight and dimensions shown are approximate.

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Safety Precaution

GENERAL GUIDELINES

1. It is advisable to insert an isolation transformer in the AC supply before servicing a hot chassis.
2. When servicing, observe the original lead dress, especially the lead dress in the high voltage circuits. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
3. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers, shields, and isolation R-C combinations, are properly installed.
4. Before turning the monitor on, measure the resistance between B+ line and cold side chassis ground. Connect the ⊖ side of an ohmmeter to the B+ lines, and the ⊕ side to chassis ground. Each line should have more resistance than specified, as follows:

B+Line	Minimum Resistance
116V (IC804 ①)	15kΩ
20V (IC751 ③)	3kΩ
15V (IC802 ①)	100Ω
12V (IC802 ③)	100Ω

5. When the monitor is not used for a long period of time, unplug the power cord from the AC outlet.
6. Potentials, as high as 27.0±1.5kV are present when this monitor is in operation. Operation of the monitor without the rear cover involves the danger of a shock hazard from the monitor power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment. Always discharge the anode of the picture tube to chassis ground before handling the tube.
7. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Turn on the monitor's power switch.
3. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the monitor, such as screwheads, connectors, control shafts, etc.
   When the exposed metallic part has a return path to the chassis, the reading should be 5MΩ~10MΩ.
   When the exposed metal does not have a return path to the chassis, the reading must be ∞.

LEAKAGE CURRENT HOT CHECK (See Fig. 1)

1. Connect a AC cord to the AC Inlet of the set.
2. Do not connect to earth the earth terminals of the AC plug.
3. Connect a 1kΩ resistor in parallel to the 10kΩ resistor and 0.015μF capacitor connected in series and connect the measuring terminals of True RMS Voltmeter to the both ends of resistors and capacitor.
4. Connect the terminals of the True RMS Voltmeter to one core of AC cord and the chassis Ground of the set.
5. Check the value of the True RMS Voltmeter is 0.1mV or less.

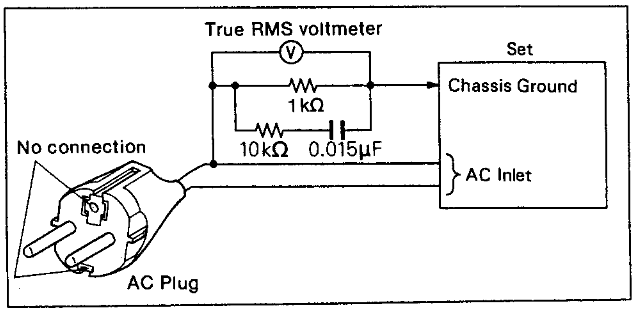


Fig. 1

X-RADIATION

WARNING: 1. The potential source of X-Radiation in Monitor set is the High Voltage section and picture tube.

2. When using a picture tube test jig for service, make sure that the jig is capable of handling 28.5kV without causing X-Radiation.

NGTE: It is important to use an accurate, periodically calibrated high voltage meter.

1. Turn the Brightness control (R5115), the Contrast control (R5111) and the RGB Contrast control (R5132) fully counterclockwise.
2. Measure the High Voltage. The meter (electrostatic type) reading should indicate 27.0±1.5kV If the meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.
3. To prevent an X-Radiation possibility, it is essential to use the specified picture tube.

HORIZONTAL OSC. DISABLE CIRCUIT TEST

This test must be made as a final check before the set is returned to the customer.

1. With the rear cover removed, supply a nominal 220−240V AC to the set, turn on the power switch.
2. Set the customer controls to their normal operating position.
3. Add DC voltage (+25V) to pin ④ of IC551.
4. Confirm that the picture falls out of horizontal sync.
5. If this does not occur, the Horizontal Osc. Disable Circuit is not operating. Follow the Horizontal Oscillator Disable Circuit Repair Procedures before the set is returned to customer.

REPAIR PROCEDURES OF HORIZONTAL OSCILLATOR DISABLE CIRCUIT

1. Connect a DC voltmeter between capacitor C515 ⊕ on the A-board and chassis ground. If nearly +24.7V is not present on that point, find the cause.
   Check R521, C515 and D558.
2. Connect a DC voltmeter between pin ⑮ of IC501 on the A-board and chassis ground.
   If nearly +3.0V is not present on that point, check R509, R510, R512, R542, IC551 and IC501.
3. Carefully check the above specified parts and related circuits and parts. When the circuit is repaired, the Horizontal Oscillator Disable Circuit Test must be made again.

Circuit Explanation

HORIZONTAL OSCILLATDR DISABLE CIRCUIT

The positive DC voltage supplied from the cathode of D558 for monitoring the high voltage is applied to pin ④ of IC551 through R521 and to the base of Q903 through R909. The voltage at the emitter of Q903 is regulated by Zener Diode D901. Under normal conditions, the voltage applied acorss the base and emitter of Q903 is not sufficient to cause emitter current to flow and holds the transistor cut off.

If the high voltage exceeds the specified level, the positive DC voltage supplied from the cathode of D558 increases. The voltage through D558 and R521 is dividing by R909 and R908, and applied to the base of Q903. If Vbe is nearly more than +0.7V, the transistor Q903 turns on, and the collector voltage of Q903 lowers which is connected to the base of Q902.

Therefore Q902 turns on, and the collector voltage of Q902 increases, which is connected to the base of Q901. Consequently Q901 turns on, and collector current of Q901, which is connected to the pin ⑮ of IC501, begins to flow simultaneously. This causes the horizontal oscillator frequency to increase, and also causes loss of horizontal synchronization. (Fig. 2)

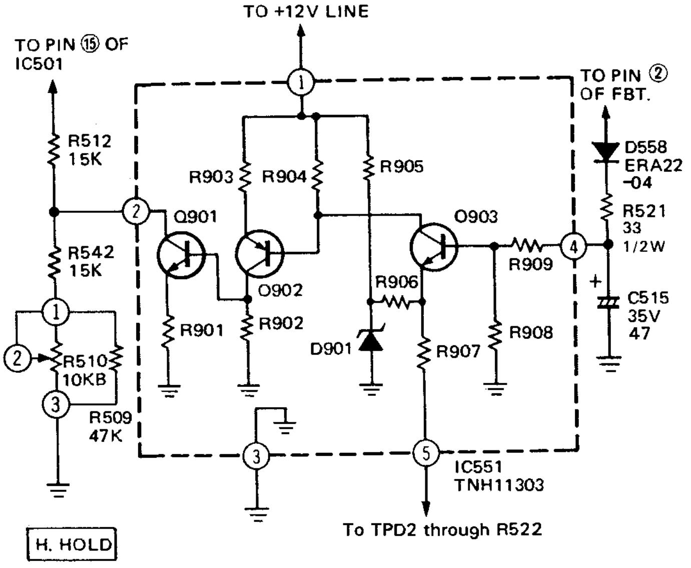


Fig. 2

Description of the Operating Symbol

Power Switch

| On ○ Off

Other

⚠ Important oporating and servicing instructions are in the papers with the appliance.

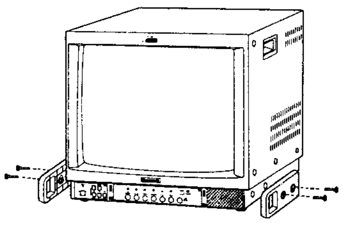
⇥	LINE A	◐	RGB Ccntrast	⊿	Phase
⇥	LINE B	◫	Aperture	◑	Chroma
⇥	RGB (Red, Green, Blue)	◑	Contrast	⊿	Volume
⊕	Overscan	☼	Brightness	⊘	Degauss

Before Using this Monitor

- Check the AC cord is connected properly.
- Check the input terminals and corresponding units are ccnnected properly. (refer to page 8, 9)

Preparation

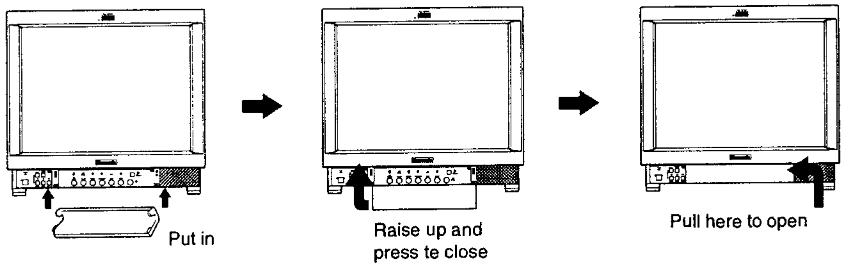
Rack Mount Handle Installation



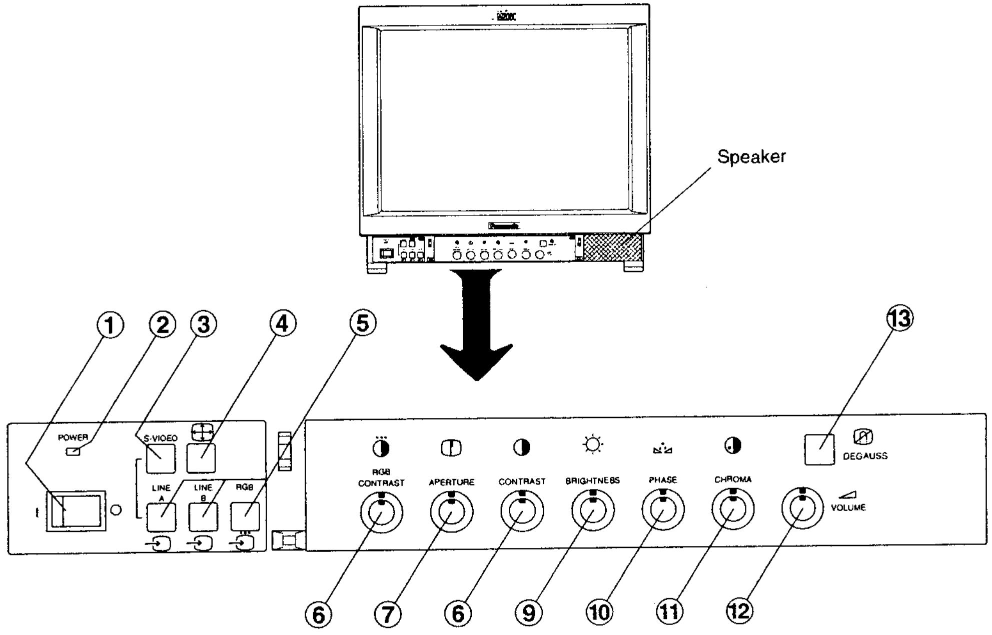
Fit on the side of this unit and fix it with 4 screws (included).
Use the Philips head screwdriver.

Front Cover Installation

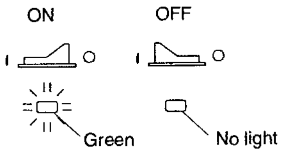
Tho cover for front controls is included with this monitor.
Install the cover to prevent unexpected changes of the adjustments.



Operation of Front Panel Controls

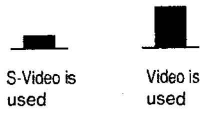

Speaker
①
②
③
④
⑤
⑬
POWER
S-VIDEO
LINE A
LINE B
RGB
RGB CONTRAST
APERTURE
CONTRAST
BRIGHTNESS
PHASE
CHROMA
DEGAUSS
VOLUME
⑥
⑦
⑥
⑨
⑩
⑪
⑫

① **Power Switch**
Press to turn the Colour Monitor ON/OFF.


ON
OFF
Green
No light

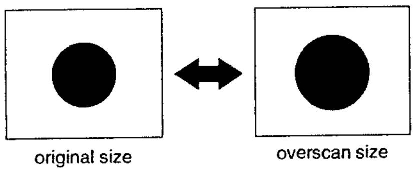
② **Power Indicator**
This indicator will light when the power is ON.

③ **S-VIDEO Switch**
Press to determine which terminal will be selected when the Line A input is switched on.


S-Video is used
Video is used

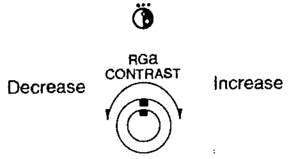
④ **Overscan Switch**
Press to incrcase the display size (approximately 117%).

To return its original display size, press this switch again.

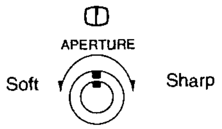

original size
overscan size

⑤ **Input Selector Switches**
Three signal inputs (LINE A/LINE B/RGB) can be selected.

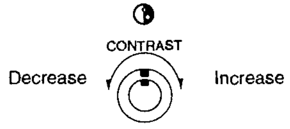
⑥ **RGB Contrast Control** (for RGB)
Adjust the contrast level for the desired overall contrast.


RGB CONTRAST
Decrease
Increase

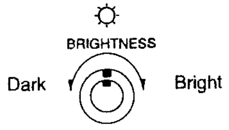
⑦ **Aperture Control** (for LINE A/LINE B)
Adjust the aperture control for the picture sharpness.
This function is ineffective at RGB input.


APERTURE
Soft
Sharp

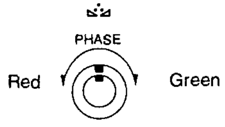
⑧ **Contrast Control** (for LINE A/LINE B)
Adjust the contrast level for the desired overall contrast.


CONTRAST
Decrease
Increase

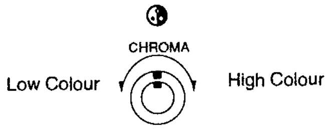
⑨ **Brightness Control**
Adjust the brightness level for the desired overall picture or display brightness.


BRIGHTNESS
Dark
Bright

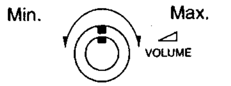
⑩ **Phase Control** (for NTSC/M-NTSC)
Adjust the phase control for the proper colour phase or flesh tone tint.
This function is ineffective at RGB input.


PHASE
Red
Green

⑪ **Chroma Control** (for LINE A/LINE B)
Adjust the chroma control to set the colour saturation level.
This function is ineffective at RGB input.

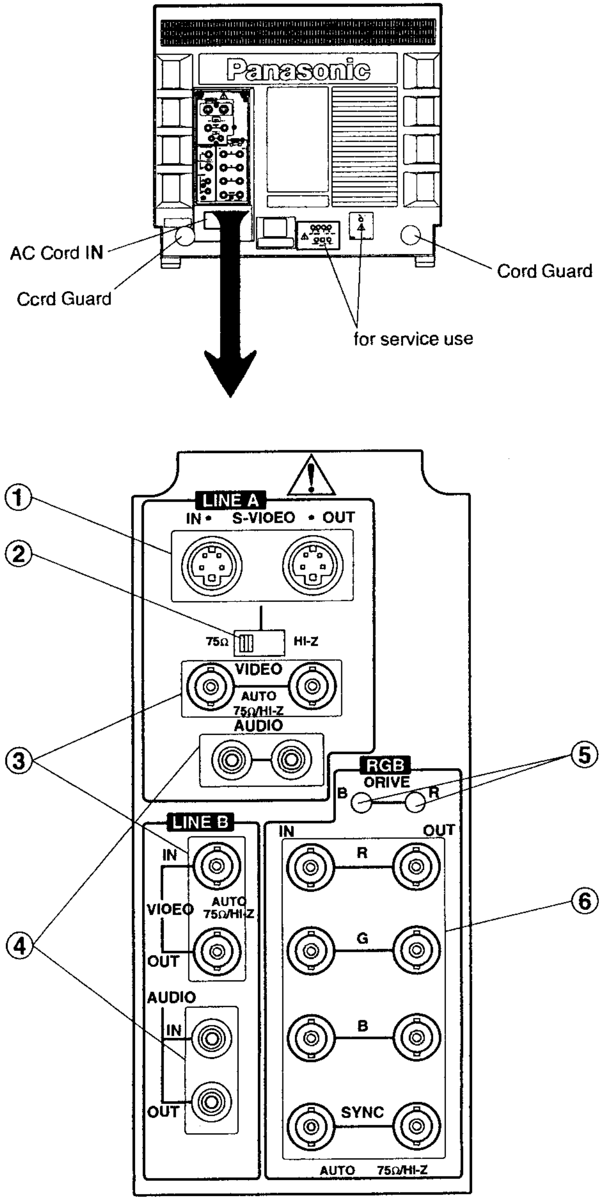

CHROMA
Low Colour
High Colour

⑫ **Volume Control**
Adjust the control for the appropriate audio level.
If the audio section is not used, turn to minimum position.

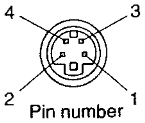

Min.
Max.
VOLUME

⑬ **Degauss Switch**
Press to degauss while the monitor is receiving a picture.
Using this switch for a continuous period will not have any beneficial effect. Wait at least 5 minutes before using this switch again.
Automatic degaussing will occur when the power is turned ON.

Operation of Rear Terminals

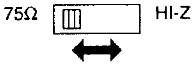

Panasonic
AC Cord IN
Ccrd Guard
Cord Guard
for service use
①
②
③
④
⑤
⑥
LINE A
IN • S-VIDEO • OUT
75Ω
HI-Z
VIDEO
AUTO
75Ω/HI-Z
AUDIO
RGB
DRIVE
B
R
LINE B
IN
VIDEO
AUTO
75Ω/HI-Z
OUT
AUDIO
IN
OUT
IN
OUT
R
G
B
SYNC
AUTO 75Ω/HI-Z

① **S-Video Input/Output Terminal** (4pin)
Luminance signal and chroma signal input/output terminal.


4
3
2
1
Pin number

Pin No.	Function
1	GND (Luminance)
2	GND (Chroma)
3	Luminance
4	Chroma

② **S-Video Impedance Switch**
Set this to HI-Z when the S-VIDEO output terminal is used. Set it to 75Ω when just the S-VIDEO IN terminal is used.



③ **Video Input/Output Terminals** (BNC)
These terminals are for use of Video signals come from video equipment.
When BNC connectors are connected into **IN** and OUT terminals, the 75Ω termination will be automatically opened.

④ **Audio Input/Output Terminals** (RCA phono)
These terminals are for use of Audio signals come from video equipment.

⑤ **RGB White Balance Adjusters**
For service use.

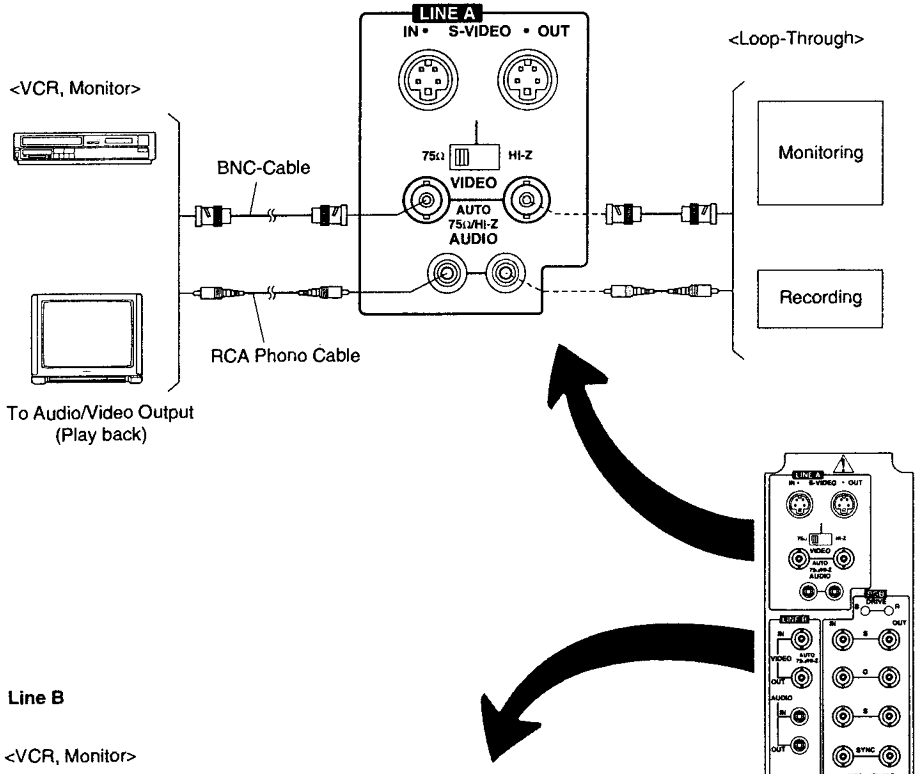
⑥ **RGB Input/Output Terminal** (BNC)
These terminals are for use of R,G,B signals and synchronize signal.
When BNC connectors are connected into **IN** and OUT terminals simultaneously, the 75Ω termination will be automatically opened.

Note:
Depress the S-VIDEO switch on the front panel to seloct the S-Video terminal when the Line A input is switched on.

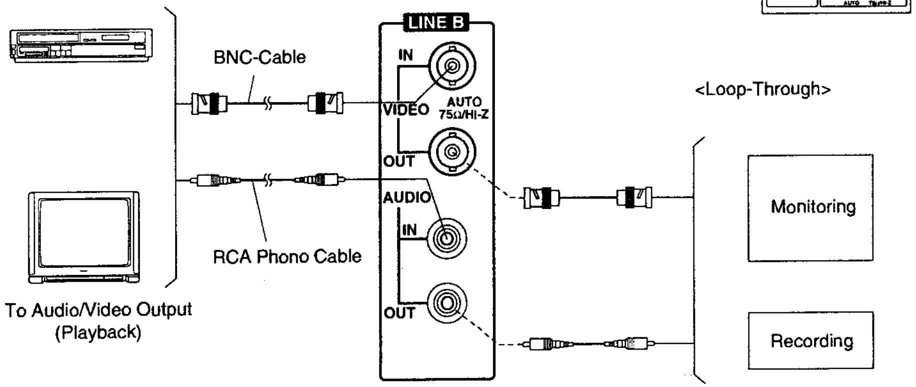
Connections

1. Video (BNC) Terminal

Line A


<VCR, Monitor>
BNC-Cable
RCA Phono Cable
To Audio/Video Output
(Play back)
LINE A
IN • S-VIDEO • OUT
75Ω
HI-Z
VIDEO
AUTO
75Ω/HI-Z
AUDIO
<Loop-Through>
Monitoring
Recording

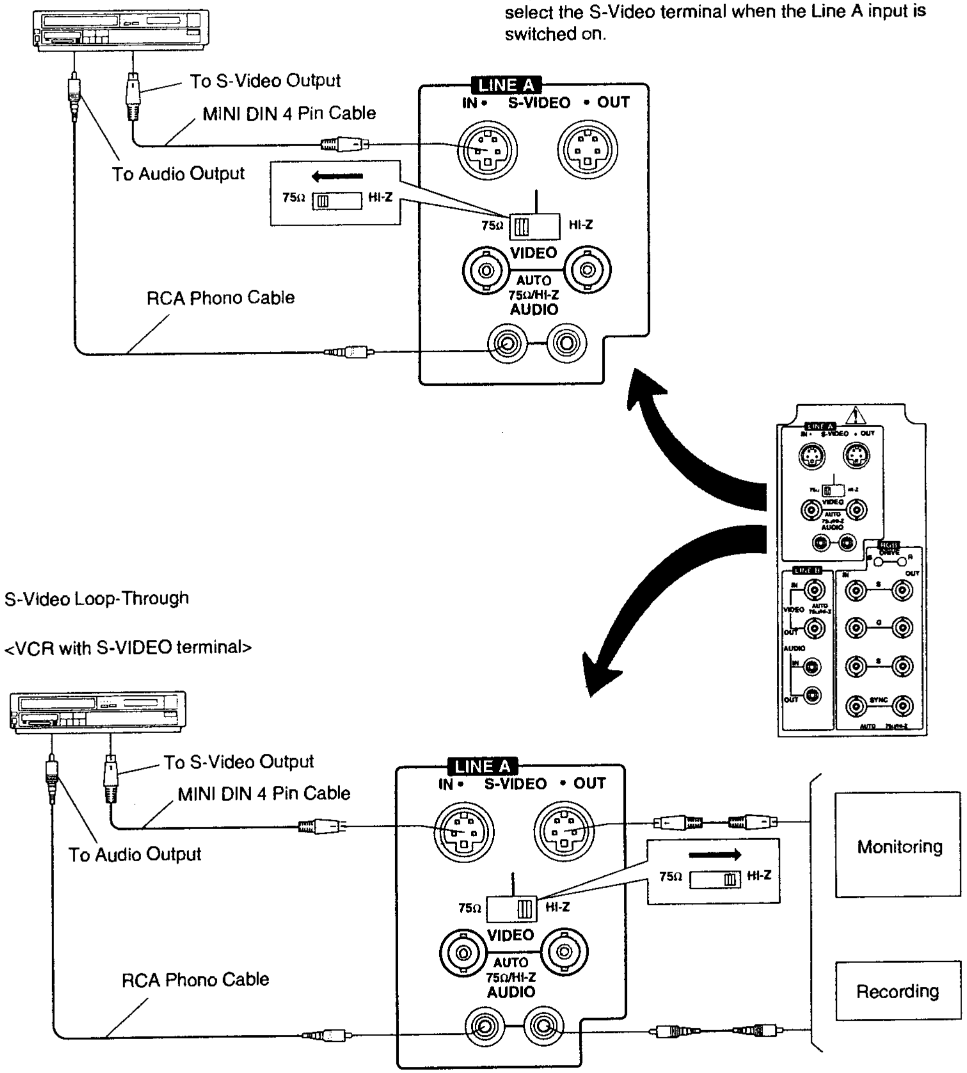
Line B


<VCR, Monitor>
BNC-Cable
RCA Phono Cable
To Audio/Video Output
(Playback)
LINE B
IN
VIDEO
AUTO
75Ω/HI-Z
OUT
AUDIO
IN
OUT
<Loop-Through>
Monitoring
Recording

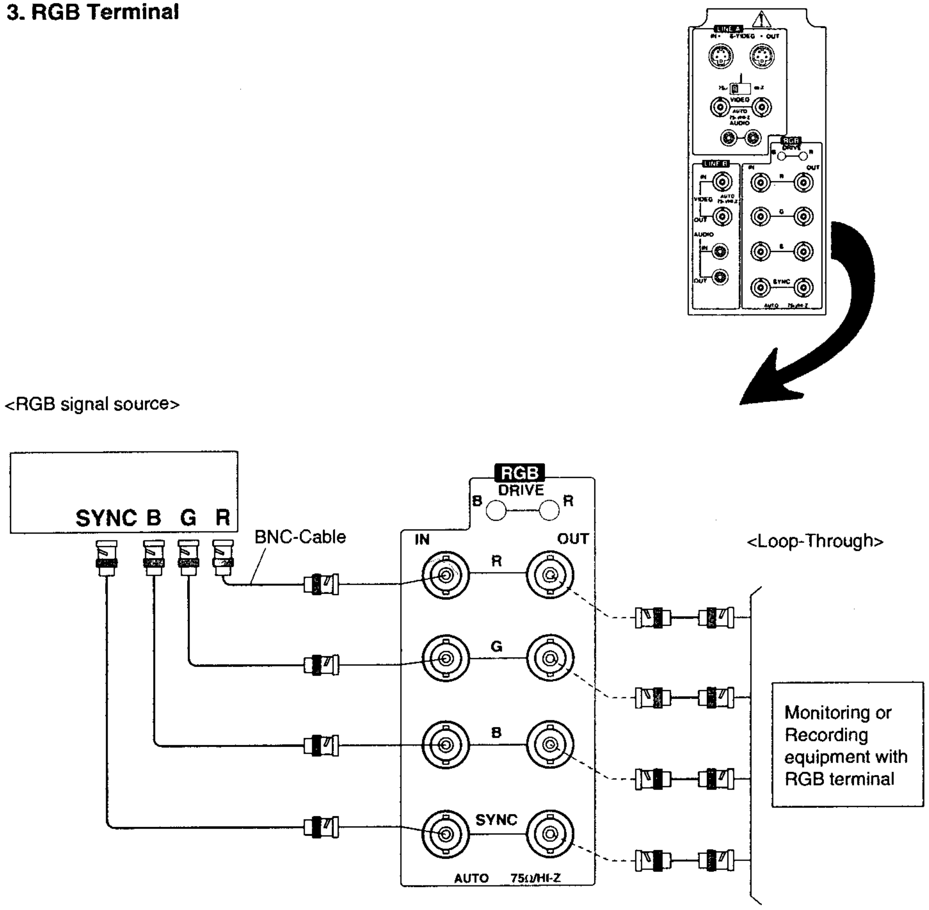
2. S-Video Terminal

<VCR with S-VIDEO terminal>

Note:
Depress the S-VIDEO switch on the front panel to select the S-Video terminal when the Line A input is switched on.


To S-Video Output
MINI DIN 4 Pin Cable
To Audio Output
RCA Phono Cable
75Ω
HI-Z
LINE A
IN • S-VIDEO • OUT
VIDEO
AUTO
75Ω/HI-Z
AUDIO
S-Video Loop-Through
<VCR with S-VIDEO terminal>
To S-Video Output
MINI DIN 4 Pin Cable
To Audio Output
RCA Phono Cable
Monitoring
Recording

3. RGB Terminal


<RGB signal source>
SYNC B G R
BNC-Cable
RGB
DRIVE
B
R
IN
OUT
R
G
B
SYNC
AUTO 75Ω/HI-Z
<Loop-Through>
Monitoring or Recording equipment with RGB terminal

Memo :

Disassembly Instructions

WARNING:

1. Before disassembly, remove the AC plug from the wall outlet.
2. When turning over a P.W. board to adjust it, be sure to lay on insulating material under it in order to prevent shorting.
3. P.W. boards and wires should no be pulled forcibly, but be handled carefully.
4. When removing the rear cover take care not to damage the neck of the Picture Tube.
5. Printed boards and connectors should be handled with care-aviod handling them forcibly!
6. When handling the A-P.W. board with the power ON, there is a risk of an Electric shock if you use the COLD side heat sink while working on the HOT side of the chassis.

CIRCUIT BOARD LAYOUT

(Rear View)

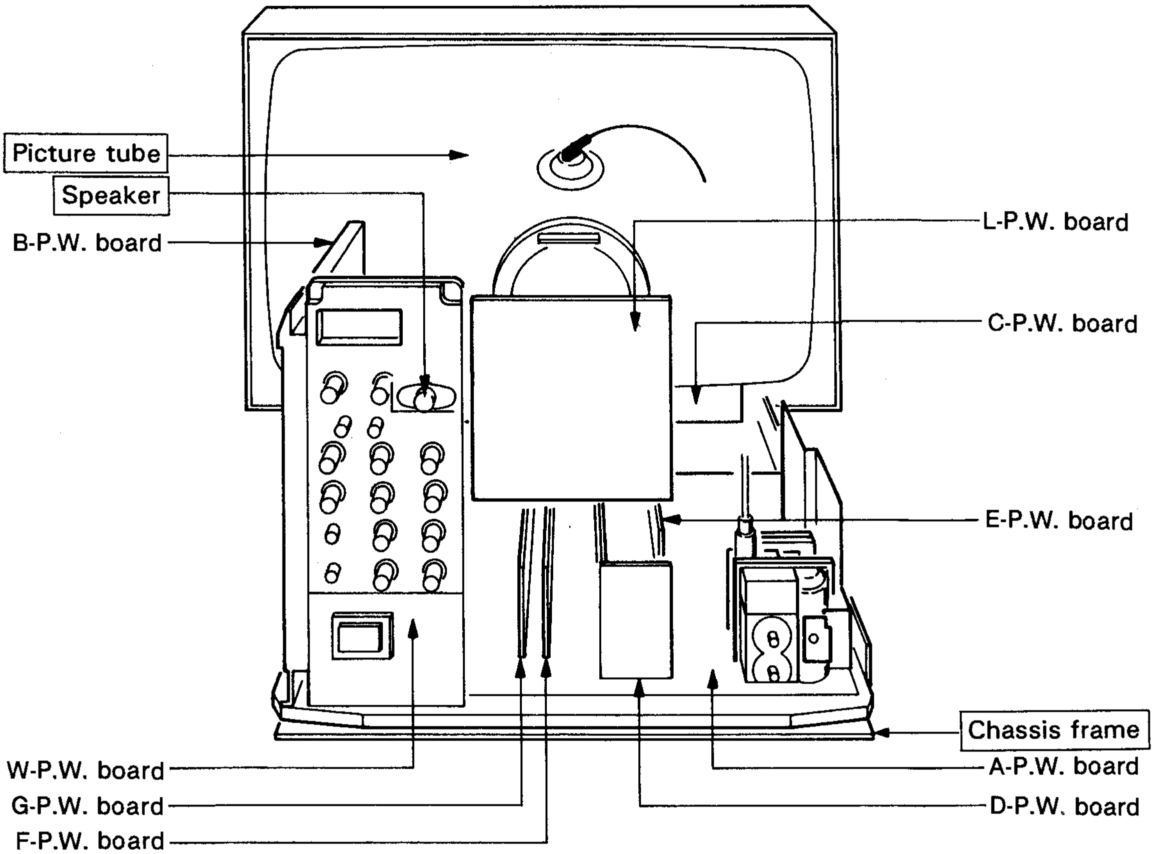
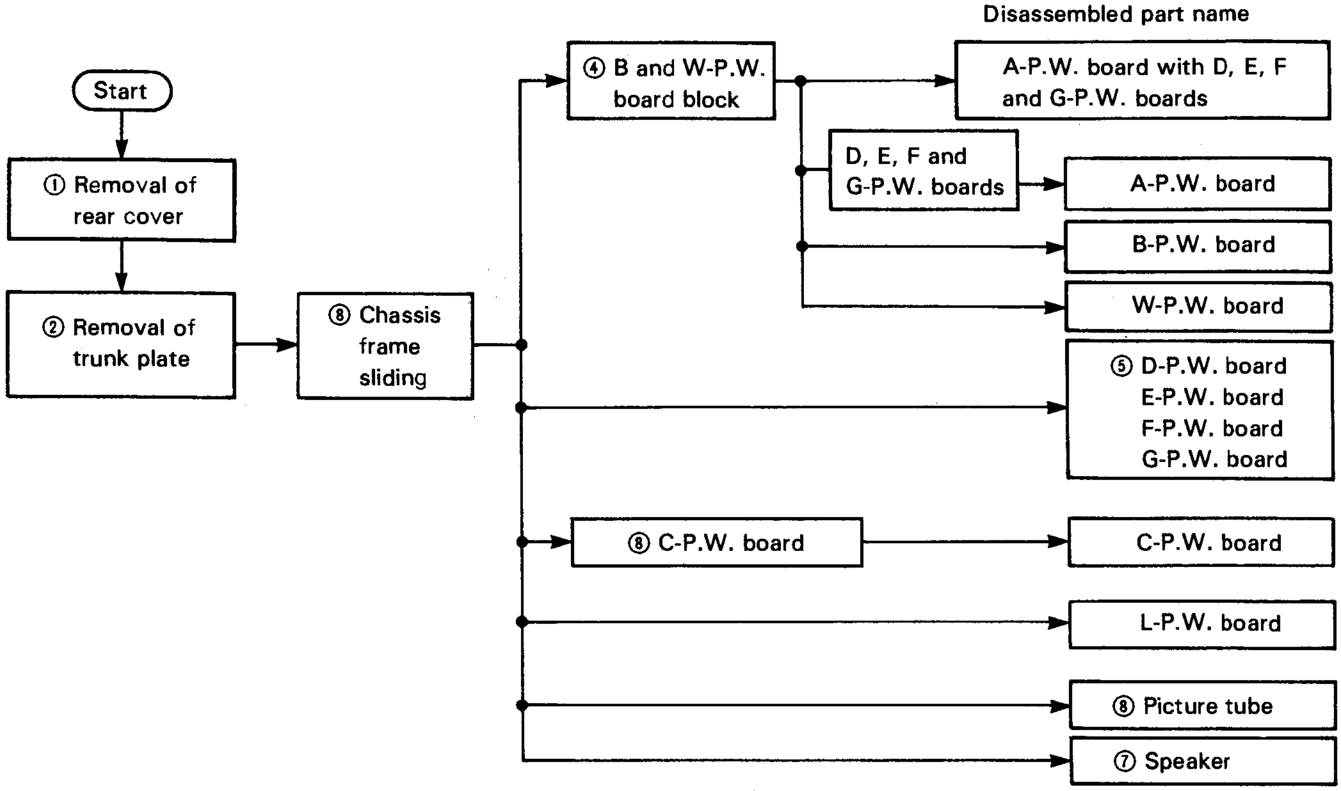

Picture tube
Speaker
B-P.W. board
L-P.W. board
C-P.W. board
E-P.W. board
Chassis frame
A-P.W. board
D-P.W. board
W-P.W. board
G-P.W. board
F-P.W. board

Fig. 1

DISASSEMBLY FLOWCHART

This flowchart indicates disassembly items of the cabinet parts and circuit boards in order to find the items necessary for servicing.

When reassembling, perform the steps in the reverse order.


Disassembled part name
Start
① Removal of rear cover
② Removal of trunk plate
⑧ Chassis frame sliding
④ B and W-P.W. board block
A-P.W. board with D, E, F and G-P.W. boards
D, E, F and G-P.W. boards
A-P.W. board
B-P.W. board
W-P.W. board
⑤ D-P.W. board
E-P.W. board
F-P.W. board
G-P.W. board
⑧ C-P.W. board
C-P.W. board
L-P.W. board
⑧ Picture tube
⑦ Speaker

1. Removal of Rear Cover

1. Remove 10 screws Ⓐ.

2. Removal of Trunk Plate

1. Remove 4 screws Ⓑ. (left side)
   (the same as right side)

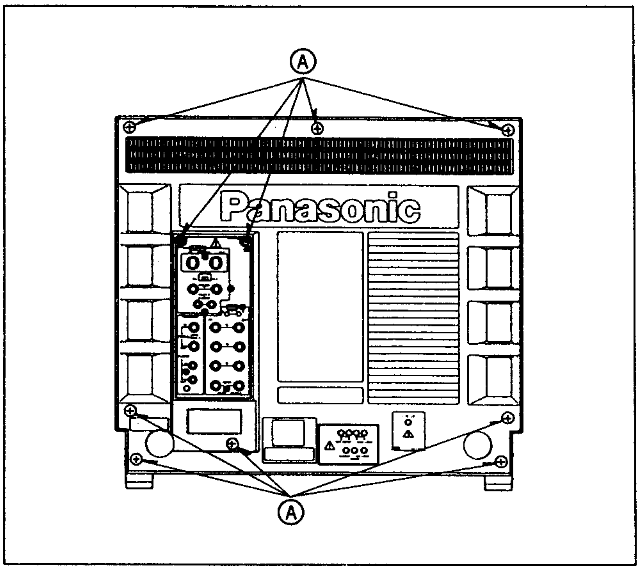


Fig. 2

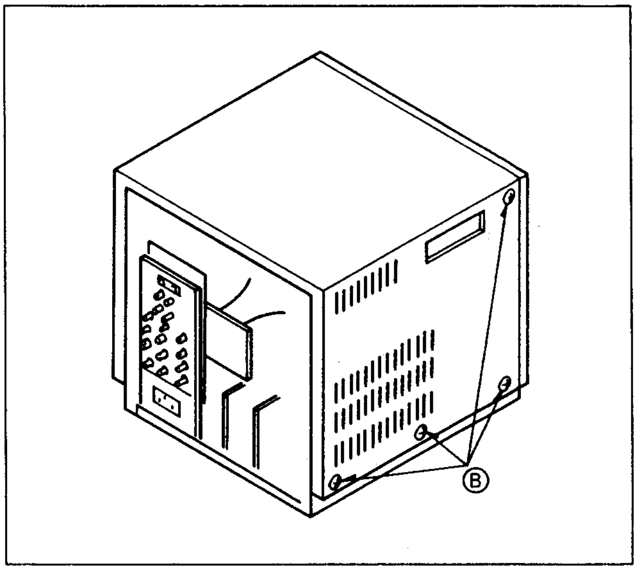


Fig. 3

3. Chassis frama sliding

Slide the chassis frame shown.

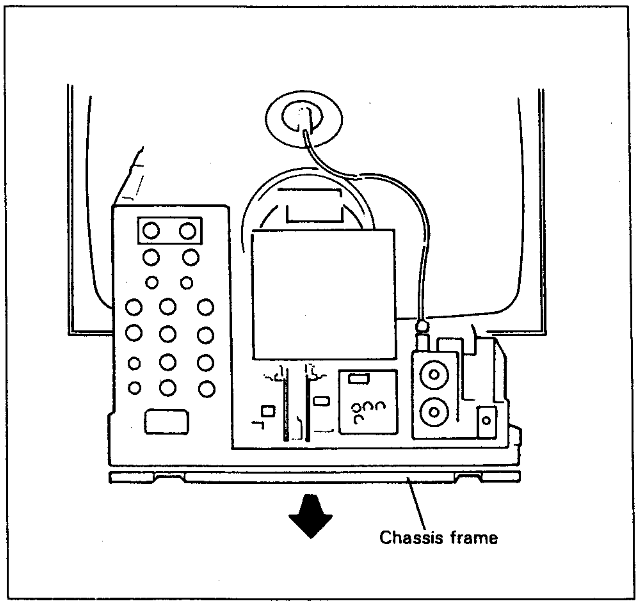

Chassis frame

Fig. 4

4. Ramoval of B and W-P.W. board block

1. Remove 3 screws ©.

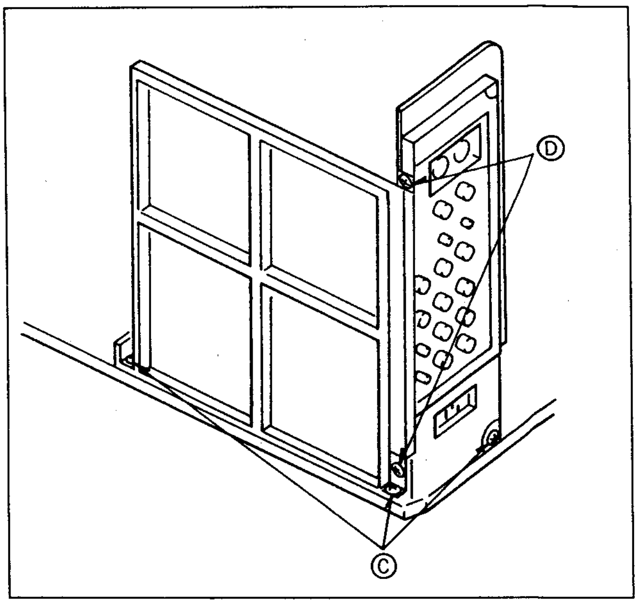


Fig. 5

2. Remove B and W-P.W. boards block while pulling out the connectors.

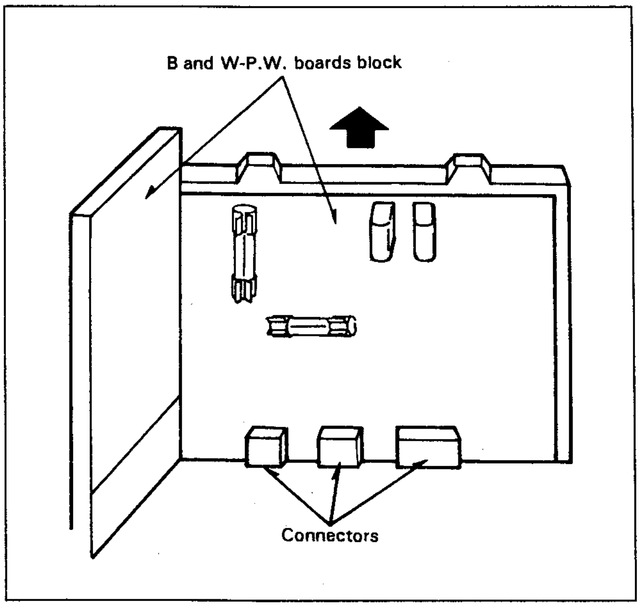

B and W-P.W. boards block
Connectors

Fig. 5

3. Remove 2 screws Ⓓ in Fig. 5.
4. Slide W-P.W. board while pulling out the conncctors B1, B2, B3 and B4.

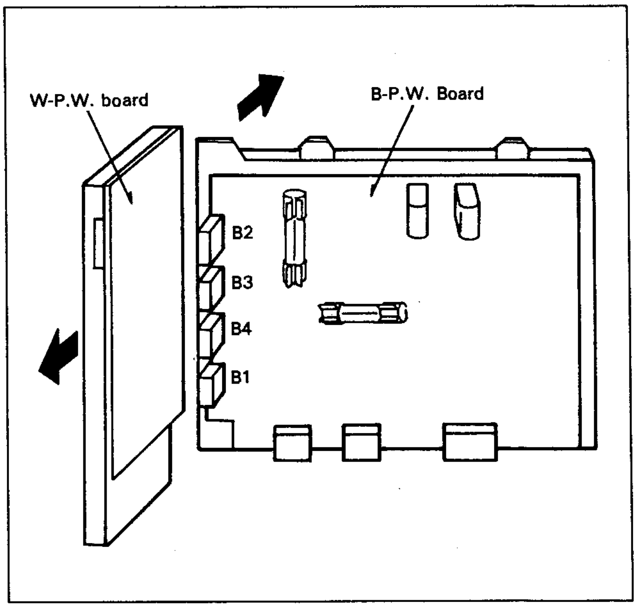

W-P.W. board
B-P.W. Board
B2
B3
B4
B1

Fig. 7

6. Removal and check of D, E, F and G-P.W. boards

1. Pull out the connectors of the each P.W. board (A26, A27, A29, A33, A14, A15, A16, A23 and A24 on the A-P.W. board).

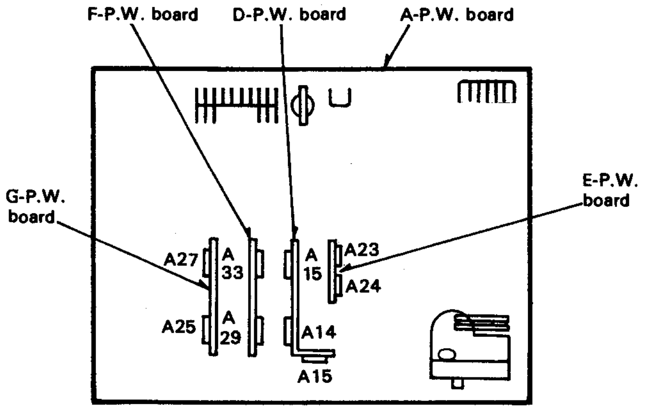

F-P.W. board
D-P.W. board
A-P.W. board
G-P.W. board
E-P.W. board
A27
A 33
A25
A 29
A 15
A23
A24
A14
A15

Fig. 9

* When each connector is removed open the hook with a small flat screwdriver as shown below.

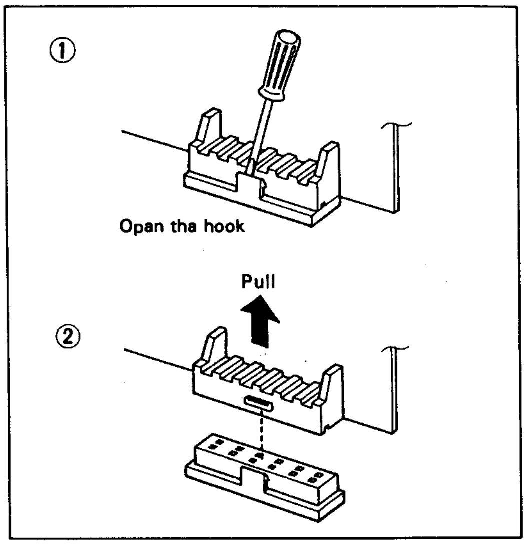

①
Open the hook
Pull
②

Fig. 9

2. Use **the extension cable** when each P.W. board is checked because there is insufficient space to troubleshoot the board.

Necessary extension cables are as following table.

Ref. No.	Kind of extension cables	Part No.	Q'ty	
Ⓐ	4 Pin	TZS507027	2pcs.	Length is about 30cm.
Ⓑ	6 Pin	TZS507028	1pc.	
Ⓒ	9 Pin	TZS507029	2pcs.	
Ⓓ	10 Pin	TZS507030	4pcs.	

3. Connect each P.W. board by extension cables as shown.

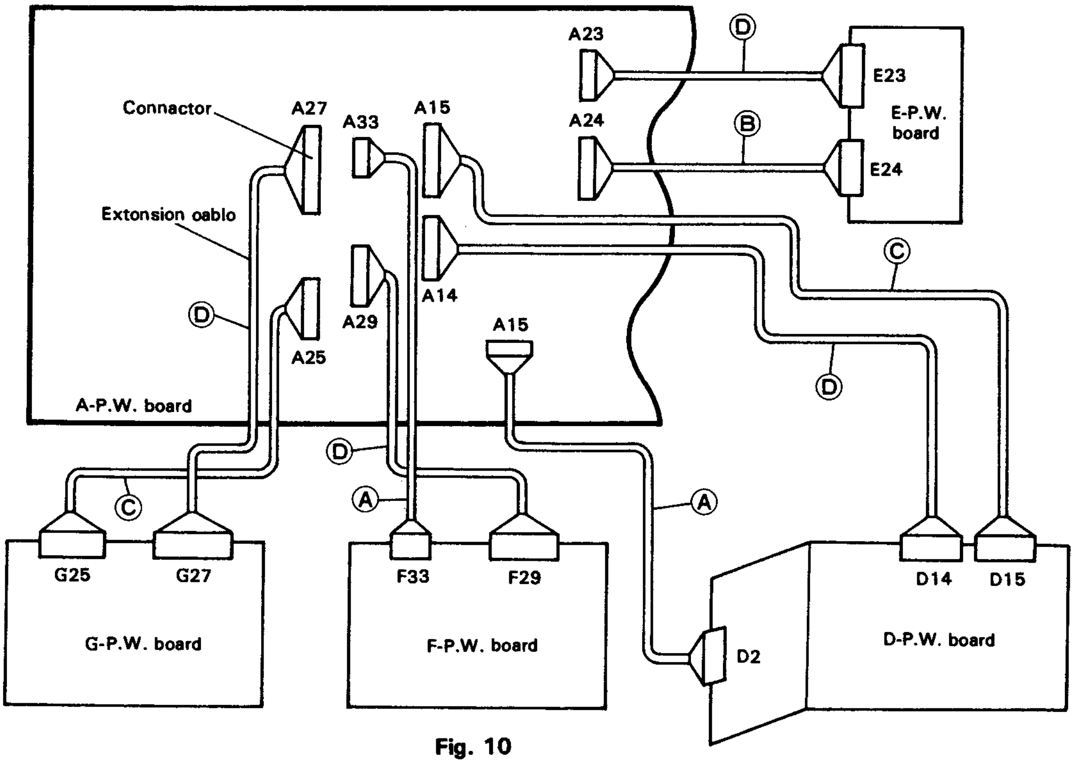

A23
Ⓓ
E23
E-P.W. board
Connector
A27
A33
A15
A24
Ⓑ
E24
Extension cable
Ⓒ
Ⓓ
A14
A29
A15
A25
Ⓓ
A-P.W. board
Ⓓ
Ⓐ
Ⓐ
Ⓒ
G25
G27
G-P.W. board
F33
F29
F-P.W. board
D2
D14
D15
D-P.W. board

Fig. 10

6. Removal of C-P.W. boerd

1. Pull out 7 control knobs on the front side.
2. Remove 3 screws Ⓔ.
3. Pull out C-P.W. board.

7. Removal of 8peeker

Remove 4 screws Ⓕ as shown in Fig. 11.

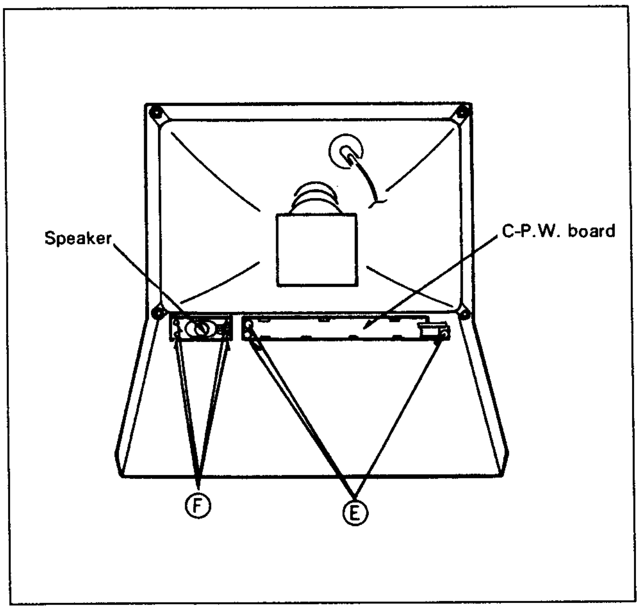

Speaker
C-P.W. board
Ⓕ
Ⓔ

Fig. 11

8. Removel of Picture Tube

1. Remove L-P.W. board and the deflection yoke.
2. Remove 4 nuts Ⓖ.

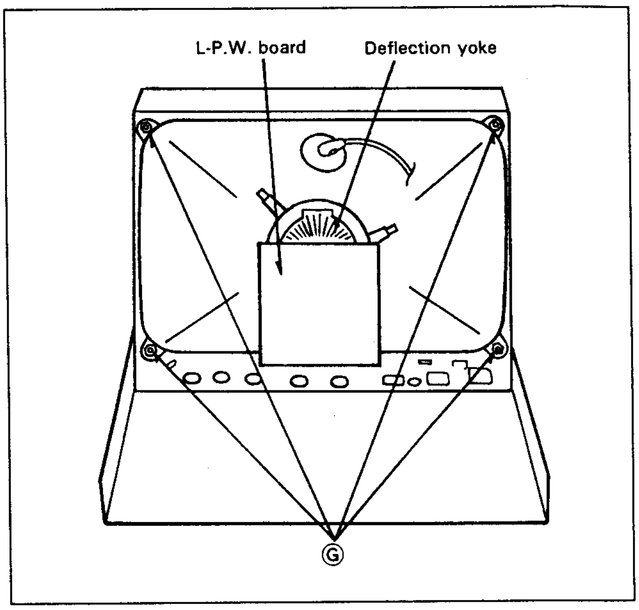

L-P.W. board
Deflection yoke
Ⓖ

Fig. 12

Measurements and Adjustments

CONTENTS

Page
ADJUSTMENT PROCEDURE FLOWCHART 17
LOCATION OF TEST POINTS AND CONTROLS 19
CAUTION FOR SERVICING 19
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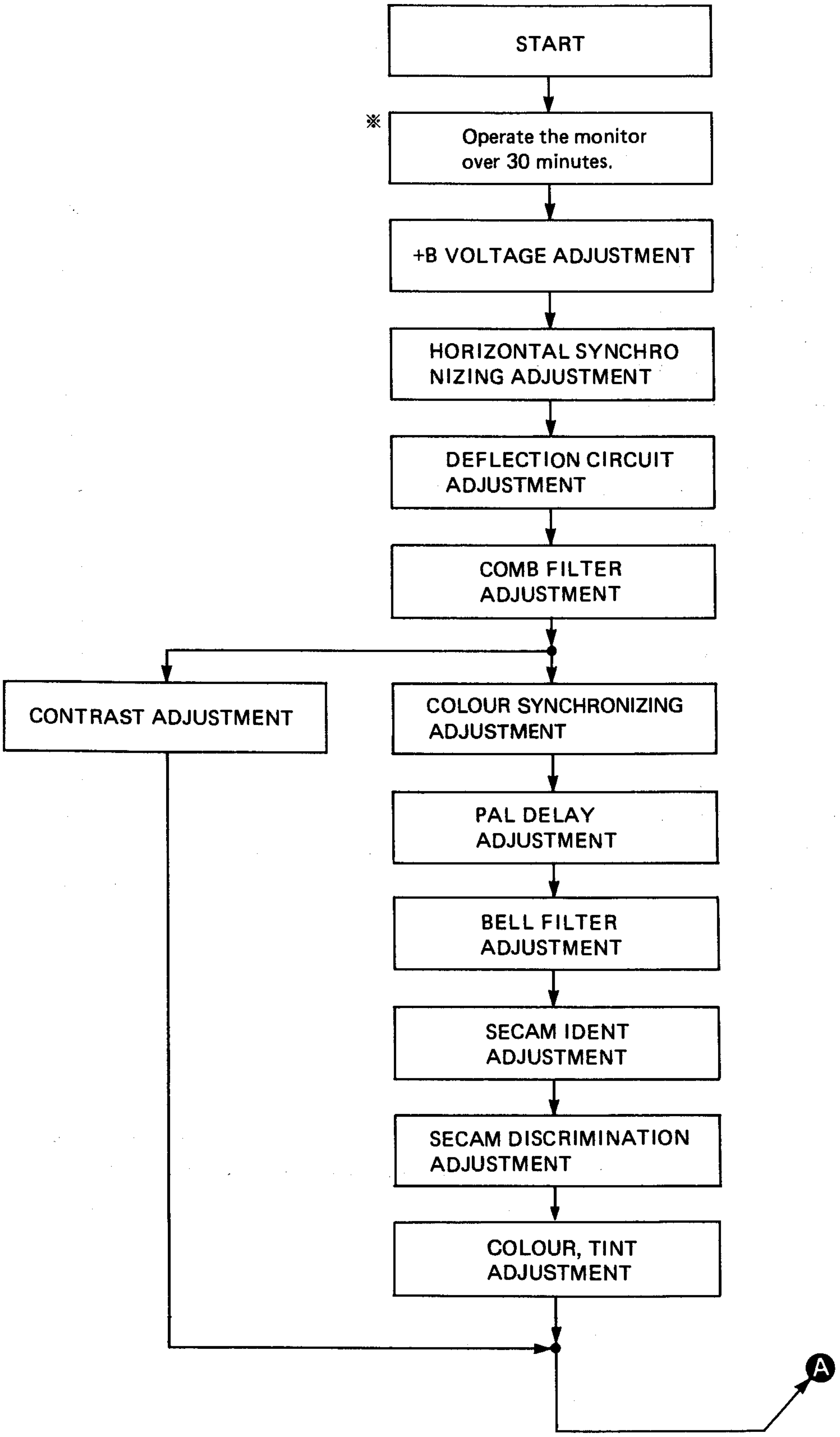
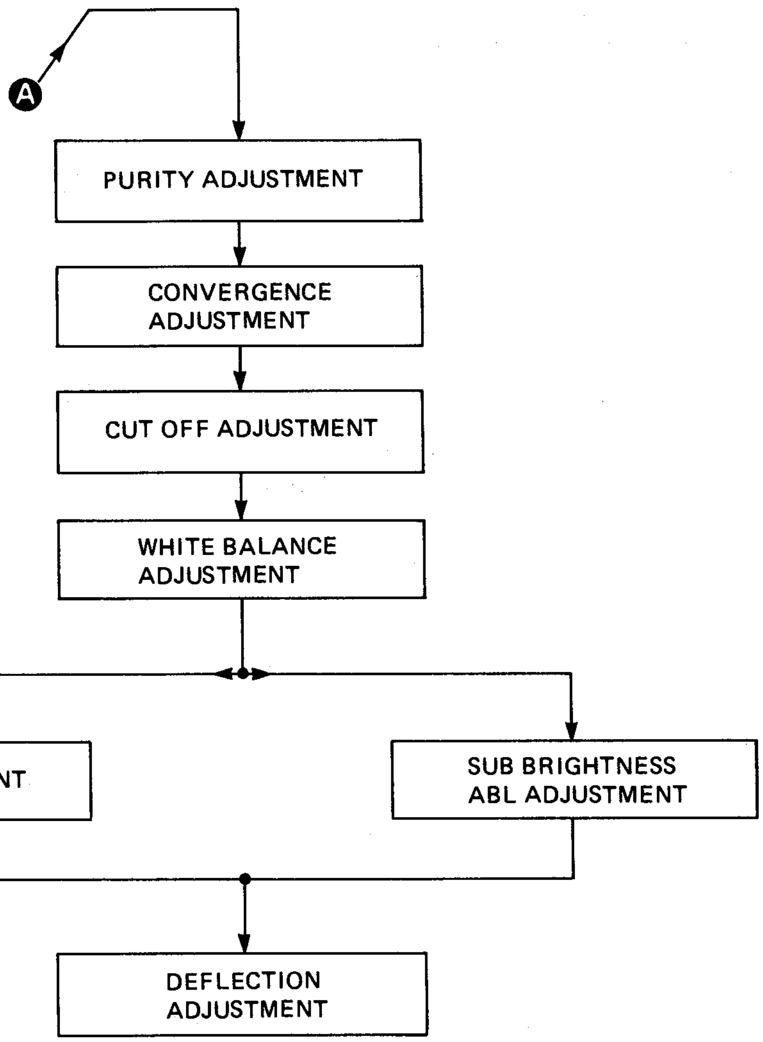
HORIZONTAL SYNCHRONIZING ADJUSTMENT 19
DEFLECTION CIRCUIT ADJUSTMENT 20
COMB FILTER ADJUSTMENT 20
CONTRAST ADJUSTMENT 21
COLOUR SYNCHRONIZING ADJUSTMENT 22
PAL DELAY LINE ADJUSTMENT 22
BELL FILTER ADJUSTMENT 23
SECAM IDENT ADJUSTMENT 23
SECAM DISCRIMINATION ADJUSTMENT 24
COLOUR, TINT ADJUSTMENT 25
PURITY ADJUSTMENT 25
CONVERGENCE ADJUSTMENT 26
CUT OFF ADJUSTMENT 27
WHITE BALANCE ADJUSTMENT 27
SUB BRIGHTNESS ABL ADJUSTMENT 28
FOCUS ADJUSTMENT 28
DEFLECTION ADJUSTMENT 28

※ NOTE: Before measuring and adjusting, operate the monitor over 30 minutes.

ADJUSTMENT PROCEDURE FLOWCHART

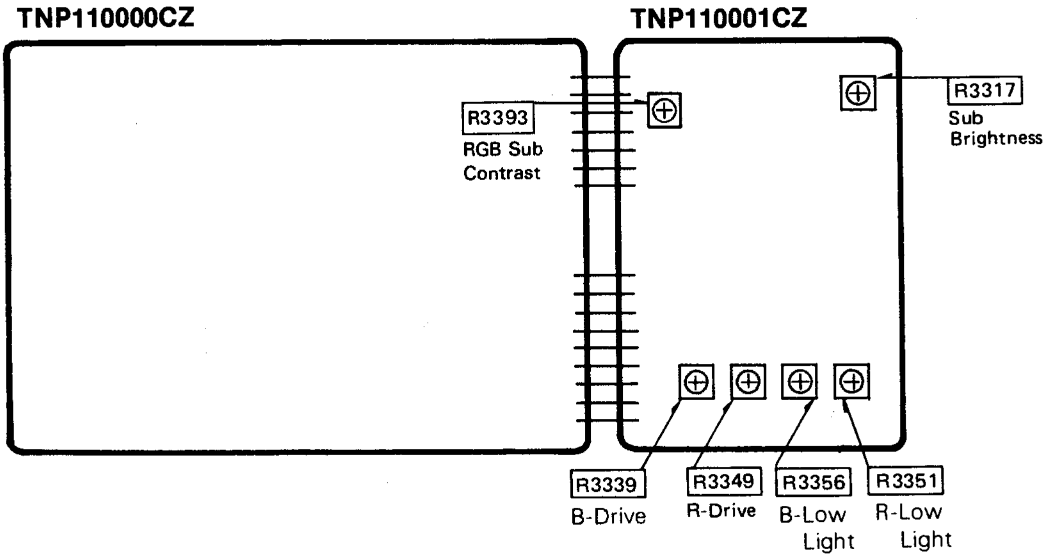

START
※
Operate the monitor over 30 minutes.
+B VOLTAGE ADJUSTMENT
HORIZONTAL SYNCHRO NIZING ADJUSTMENT
DEFLECTION CIRCUIT ADJUSTMENT
COMB FILTER ADJUSTMENT
CONTRAST ADJUSTMENT
COLOUR SYNCHRONIZING ADJUSTMENT
PAL DELAY ADJUSTMENT
BELL FILTER ADJUSTMENT
SECAM IDENT ADJUSTMENT
SECAM DISCRIMINATION ADJUSTMENT
COLOUR, TINT ADJUSTMENT
A


A
PURITY ADJUSTMENT
CONVERGENCE ADJUSTMENT
CUT OFF ADJUSTMENT
WHITE BALANCE ADJUSTMENT
FOCUS ADJUSTMENT
SUB BRIGHTNESS ABL ADJUSTMENT
DEFLECTION ADJUSTMENT

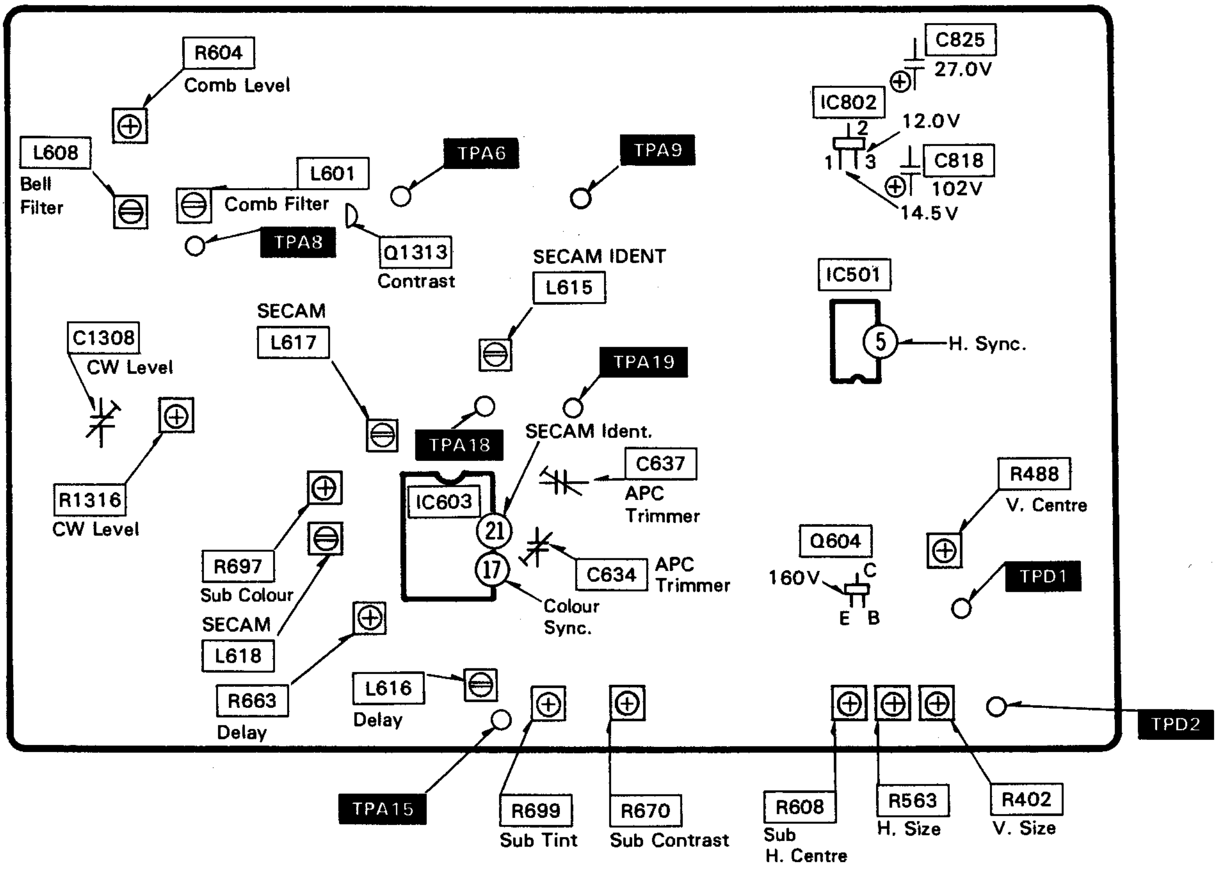
LOCATION OF TEST POINTS AND CONTROLS

Note: When measuring and adjusting, it is convenient to use these pages.

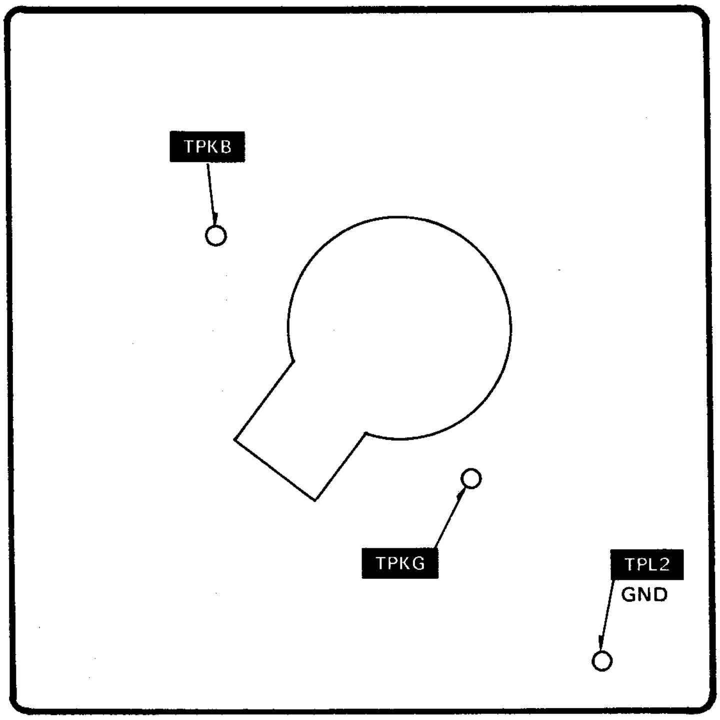
D-P.W. board


TNP110000CZ
TNP110001CZ
R3393
RGB Sub Contrast
R3317
Sub Brightness
R3339
B-Drive
R3349
R-Drive
R3356
B-Low Light
R3351
R-Low Light

A-P.W. board TNP190100FZ


R604
Comb Level
L608
Bell Filter
L601
Comb Filter
TPA6
TPA9
TPA8
Q1313
Contrast
SECAM IDENT
L615
C825
27.0V
IC802
12.0V
2
1
3
C818
102V
14.5V
IC501
5
H. Sync.
C1308
CW Level
SECAM
L617
TPA19
TPA18
SECAM Ident.
R1316
CW Level
C637
APC Trimmer
IC603
21
17
C634
APC Trimmer
Colour Sync.
R697
Sub Colour
SECAM
L618
R663
Delay
L616
Delay
Q604
160V
C
E B
R488
V. Centre
TPD1
TPD2
TPA15
R699
Sub Tint
R670
Sub Contrast
R608
Sub H. Centre
R563
H. Size
R402
V. Size

L-P.W. board TNP111210ZA


TPKB
TPKG
TPL2
GND

CAUTION FOR SERVICING

This model has the HOT and COLD section with the power supply section. Therefore following precautions are necessary.

1. Do not touch the HOT section and the COLD section at the same time. You may receive an electric shock.
2. Do not short the HOT section to the COLD section. This could blow the fuse or even damage parts.
3. Never measure the HOT section and the COLD section at the same time when using tools such as oscilloscopes or multimeters.
4. Always unplug the unit before beginning any operation such as removing the chassis.
5. For each adjustment, when a connector or a short jumper is connected or disconnected, first set the power switch to the OFF position.

Unless otherwise noted, a transformer core with has two tuning peak points should be adjusted at the lower position as shown in below Fig. 1.

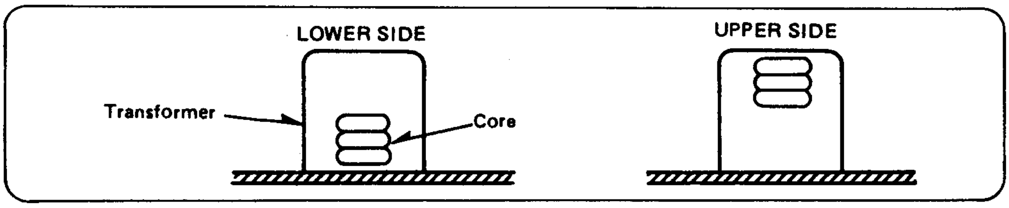


Fig. 1

+B VOLTAGE ADJUSTMENT (A-P.W. board)

1. EOUIPMENT TO USED

Digital Voltmeter

Tuner Unit.

2. ADJUSTMENT PROCEDURE

1. Input a Black Level pattern to VIDEO input terminal.
2. Set the Brightness and Contrast control to minimum, and delete the raster.
3. Connect a Digital Voltmeter between each +B points and the earth as follows.
4. Confirm the voltage at the following points as is indicated in the table below.

Maaeuremant Point		Voltage
+B2 (C818 ⊕)	H. Sink Plete (eerth)	113V±2.0V
+B1 (0504 Ⓔ)		172V±10V
+B3 (C825 ⊕)		28.3V±2.0V
+B5 (IC802 ①)		15.8V±1.0V
+B6 (IC802 ⑤)		12.0V±0.5V

HORIZONTAL SYNCHRONIZING ADJUSTMENT (A-P.W. board)

1. EOUIPMENT TO USED

Short Jumper

Video Generator

Frequency Counter

2. ADJUSTMENT PROCEDURE

1. Input a Monoscope pattern to VIDEO input terminal.
2. Connect a short jumper between IC501 ⑤ and 12V line.
3. Connect a frequency counter to horizontal lead wire (Red) for DY.
4. Adjust R510 (H. Hold) to 15.625kHz±0.2kHz.

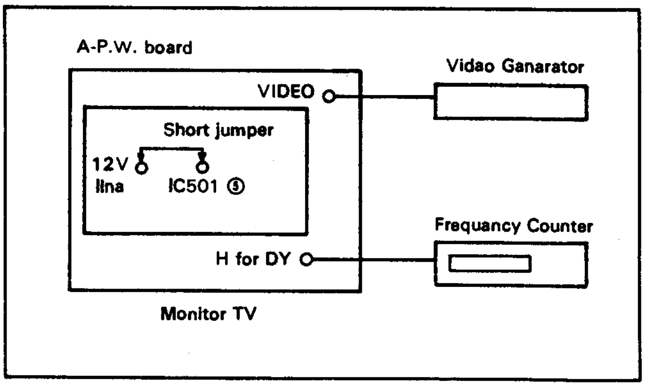


Fig. 2

5. Disconnect a short jumper.
6. Confirm that the H-sync is locked and the picture is stable.

DEFLECTION CIRCUIT ADJUSTMENT (A/D-P.W. Board)

1. EOUIPMENT TO USED

High Voltmeter

DC Current Meter

AC-RMS voltmeter

2. ADJUSTMENT PROCEDURE

1. Input a Monoscope pattern to VIDEO input terminal.
2. Connect a ⊕ side of DC Current Meter to TPD1 and ⊖ side of DC Current Meter to TPD2.
3. Adjust R3317 (Sub Brightness) or R670 (Sub Contrast) so that the value of DC Current Meter is 400μA.

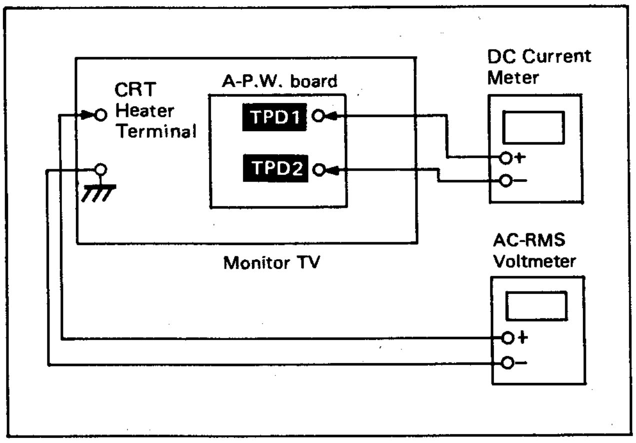

CRT
Heater
Terminal
A-P.W. board
TPD1
TPD2
Monitor TV
DC Current
Meter
+
−
AC-RMS
Voltmeter
+
−

Fig. 3

4. Connect a AC-RMS voltmeter to CRT Heater terminal.
5. Confirm that the value is 6.00±0.24Vrms.
6. Input a Black Level pattern to VIDEO input terminal.
7. Set the R3317 (Sub Brightness) and R670 (Sub Contrast) to minimum, and delete the raster.
8. Connect a High Voltmeter to anode of CRT.

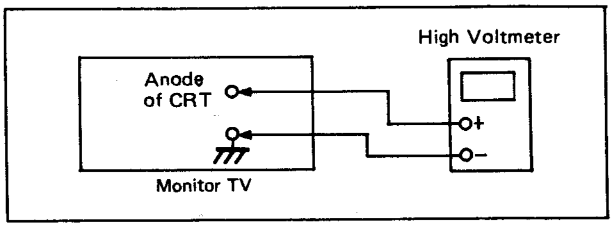

Anode
of CRT
Monitor TV
High Voltmeter
+
−

Fig. 4

9. Confirm that the value is 27.0±1.5kV.

COMB FILTER ADJUSTMENT (A-P.W. Board)

1. EOUIPMENT TO USED

Oscilloscope

Video Generator

2. INITIALIZE CONDITION

Input Selector Switches . . . . LINE A

3. ADJUSTMENT PROCEDURE

1. Input a Colour Bar signal to VIDEO input terminal.
2. Connect an Oscilloscope to TPA8.

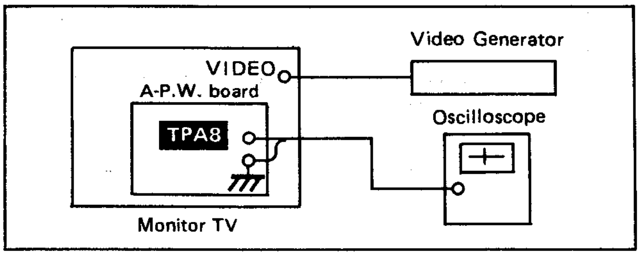

VIDEO
A-P.W. board
TPA8
Monitor TV
Video Generator
Oscilloscope

Fig. 6

3. Adjust R604 (Comb Level) and L601 to set 3.58MHz sub carrier at the minimum amplitude.
4. Confirm that 3.58 MHz sub carrier portion of the magenta is less than 50mVp-p as shown in Fig. 6.

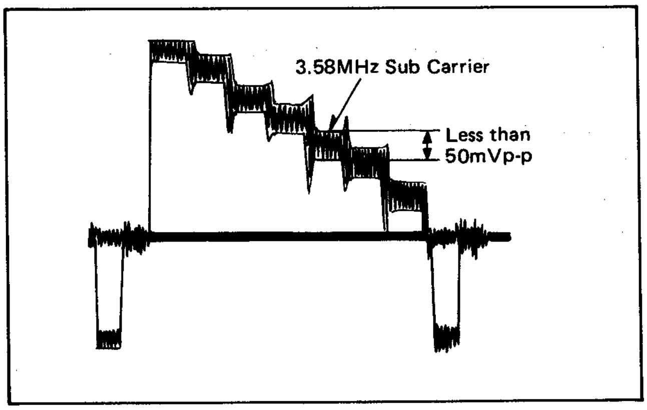


Fig. 6

5. If the amplitude is more than 50mVp-p repeat the adjustments described in step 3 through 4.

6. Disconnect an oscilloscope from TPA8 and connect an oscilloscope to TPA6

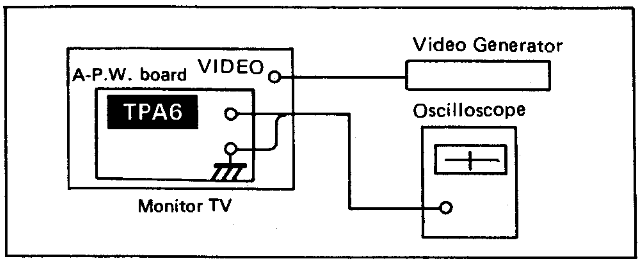

A-P.W. board
VIDEO
TPA6
Monitor TV
Video Generator
Oscilloscope

Fig. 7

7. Adjust R1316 (CW Level) and C1308 to set 3.58 MHz sub carrier at the minimum amplitude.
8. Confirm that 3.58 MHz sub carrier portion of the magenta is less than 200mVp-p as shown in Fig. 8.

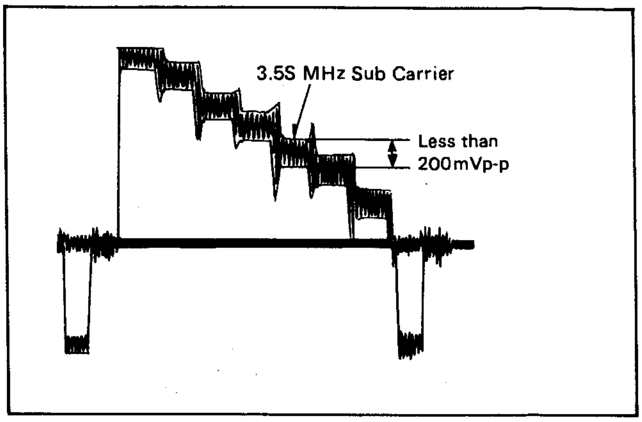


Fig. 8

9. If the amplitude is more than 200mVp-p repeat the adjustments described in step 7 through 8.

CONTRAST ADJUSTMENT (A/D/L-P.W. board)

1. EQUIPMENT TO USED

Oscilloscope
Video Generator

2. INITIALIZE CONDITION

RGB Contrast Control .... Max.
Contrast Control .... Max.
Brightness Control .... Min.

3. ADJUSTMENT PROCEDURE

1. Set the Input Selector Switches to LINE A.
2. Input a Cross Hatoh pattern signal to VIDEO input terminal.
3. Connect an Oscilloscope to emitter of Q1313.

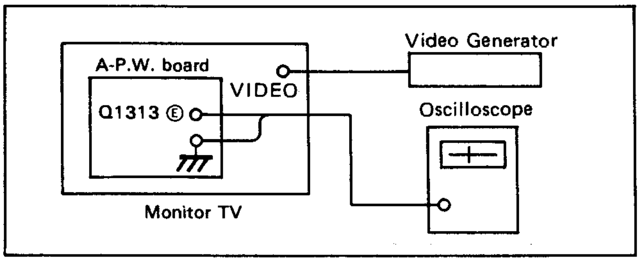

A-P.W. board
VIDEO
Q1313 Ⓔ
Monitor TV
Video Generator
Oscilloscope

Fig. 9

4. Confirm that the A is 0V at emitter of Q1313.

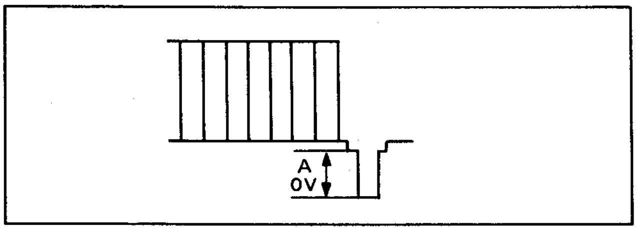


Fig. 10

5. Disconnect an Oscilloscope from emitter of Q1313 and connect an Oscilloscope to TPKG and TPL2 (earth)

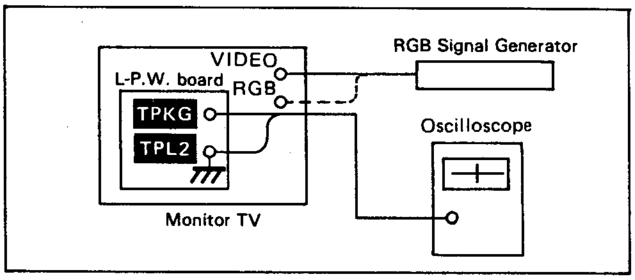

VIDEO
L-P.W. board
RGB
TPKG
TPL2
Monitor TV
RGB Signal Generator
Oscilloscope

Fig. 11

6. Be sure that D is 30±10Vp-p.
   If the D is not 30±10Vp-p, adjust R3317 (Sub Brightness).
7. Adjust R670 (Sub Contrast) so that the C is 55Vp-p at TPKG as shown in Fig. 12.

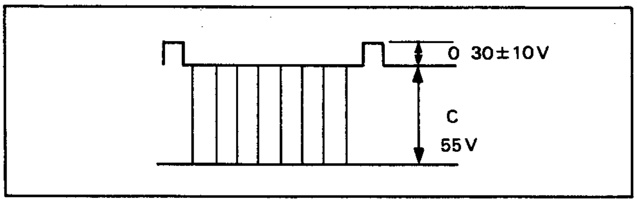


Fig. 12

8. Set the input selector switches to RGB.
9. Input a cross hatch pattern signal to RGB terminal.
10. Adjust R3393 (RGB Sub Contrast) so that the C is 55Vp-p at TPKG as shown in Fig. 12.
11. Set the picture to first lightup colour (glimmer) by R3317 (Sub Brightness).

COLOUR SYNCHRONIZING ADJUSTMENT (A-P.W. board)

1. EQUIPMENT TO USED

Oscilloscope Short Jumper
Video Generator

2. ADJUSTMENT PRDCEDURE

1. Set the Input Selector switches to LINE A.
2. Input a PAL Colour Bar pattern signal to LINE A VIDEO input terminal.
3. Connect a short jumper between IC603 ⑰ and earth.
4. Connect an Osciloscope to **TPA19**.
5. Adjust C637 (APC Trimmer) so that the waveform stabilized, or in a slowly moving state.
6. Disconnect a short jumper, and confirm that the waveform is stable.
7. Input a NTSC Colour Bar pattern signal to LINE A VIDEO input terminal.
8. Connect a short jumper between IC603 ⑰ and earth.
9. Adjust C634 (APC Trimmer) so that the waveform is stabilized, or in a slowly moving state.
10. Disconnect the short jumper, and eonfirm that the waveform is stable.
11. Input a PAL Colour Bar pattern signal to LINE A and NTSC Colour Bar pattern signal to LINE B temrinal.
12. Confirm that the colour is put on without delay when the signal is switched over from LINE A to LINE B.

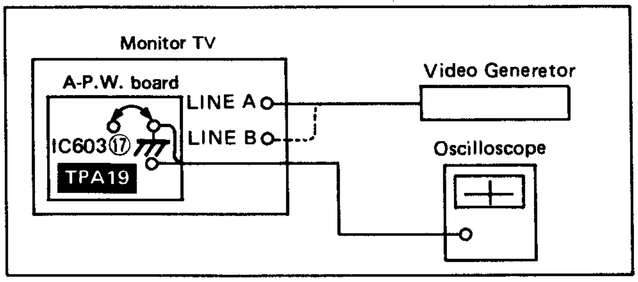

Monitor TV
A-P.W. board
LINE A
LINE B
IC603⑰
TPA19
Video Generetor
Oscilloscope

Fig. 13

PAL DELAY LINE ADJUSTMENT (A-P.W. board)

1. EOUIPMENT TO USED

Oscilloscope
Video Generator

2. ADJUSTMENT PRDCEDURE

1. Set the Input Selector switches to LINE A.
2. Input a PAL Colour Bar pattern signal to VIDEO input terminal.
3. Connect an Oscilloscope to **TPA19**.
4. Adjust L616 (Delay Matching Trans.) and R663 (Delay Line Adj.) to achieve waveform shown in Fig. 15.

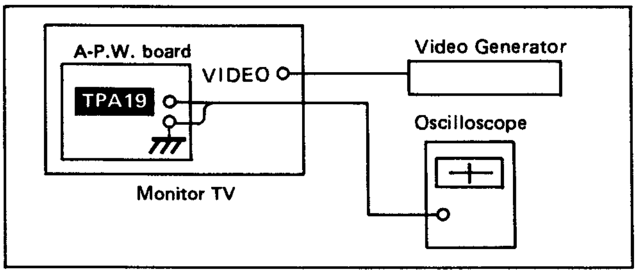

A-P.W. board
VIDEO
TPA19
Monitor TV
Video Generator
Oscilloscope

Fig. 14

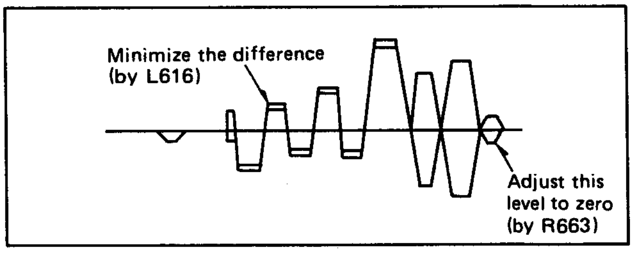

Minimize the difference (by L616)
Adjust this level to zero (by R663)

Fig. 15

BELL FILTER ADJUSTMENT (A-P.W. board)

1. EOUIPMENT TO USED

Oscilloscope
10kΩ Resistor
Video Generator

2. ADJUSTMENT PROCEDURE

1. Set the Input Selector switches to LINE A.
2. Input a SECAM Colour Bar pattern signal to VIDEO input terminal.
3. Connect an Oscilloscope to TPA15 via 10Ω resistor.

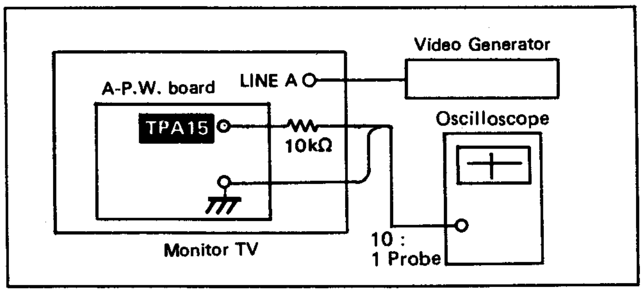

Video Generator
A-P.W. board
LINE A
TPA15
10kΩ
Oscilloscope
Monitor TV
10 : 1 Probe

Fig. 18

4. Make even the amplitude of B and R of chrominance of colour bar by L603 (Bell Filter) as shown in Fig. 17.

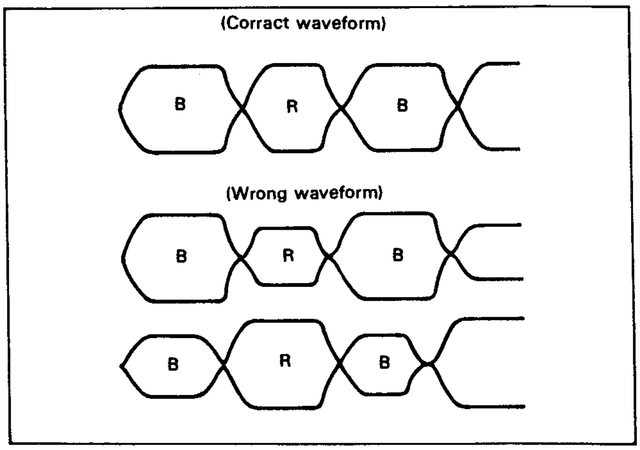

(Corract waveform)
B
R
B
(Wrong waveform)
B
R
B
B
R
B

Fig. 17

SECAM IDENT ADJUSTMENT (A-P.W. board)

1. EOUIPMENT TO USED

Oscilloscope
Video Generator
10kΩ Resistor

2. ADJUSTMENT PROCEDURE

1. Set the Input Selector switches to LINE A.
2. Input a SECAM Colour Bar pattern signal to VIDEO input terminal.
3. Connect an Oscilloscope IC603 ㉑ via 10kΩ resistor.

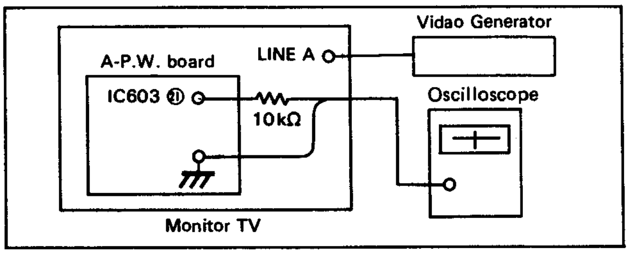

Vidao Generator
A-P.W. board
LINE A
IC603 ㉑
10kΩ
Oscilloscope
Monitor TV

Fig. 18

4. Adjust L615 (SECAM Ident) so that the voltage is maximum.

SECAM DISCRIMINATION ADJUSTMENT (A-P.W. board)

1. EQUIPMENT TO USED

Oscilloscope

Video generator

2. ADJUSTMENT PROCEDURE

1. Set the input selector switches to LINE A.
2. Input a SECAM colour bar pattern signal to VIDEO input terminal.
3. Connect an oscilloscope CH1 to **TPA19** and CH2 to **TPA18**. (200mV range)
4. Checking the waveform as shown in Fig. 20.

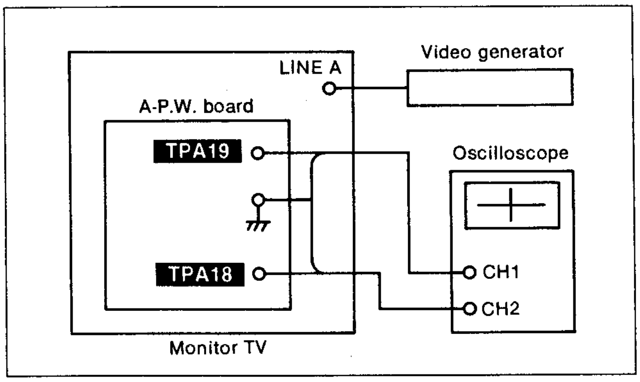

LINE A
Video generator
A-P.W. board
TPA19
Oscilloscope
TPA18
CH1
CH2
Monitor TV

Fig. 19

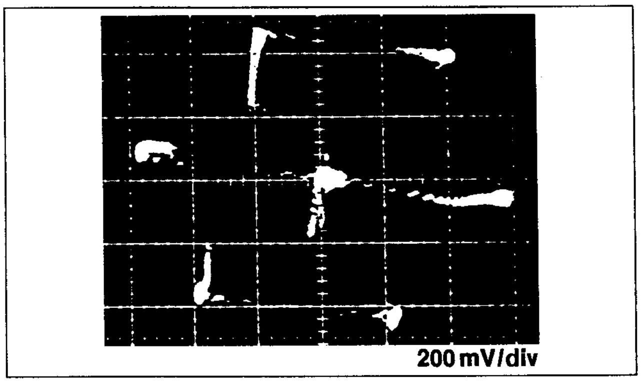


Fig. 20

5. Set the range to 20mV.
6. Adjustment L617 (X-axis) and L618 (Y-axis) so that the points A and B become almost together. (Fig. 21 and Fig. 22)

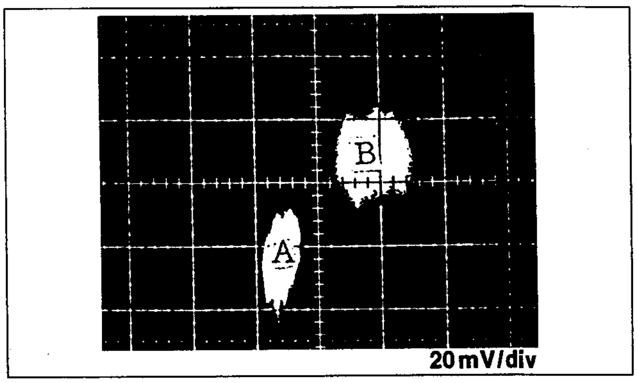


Fig. 21

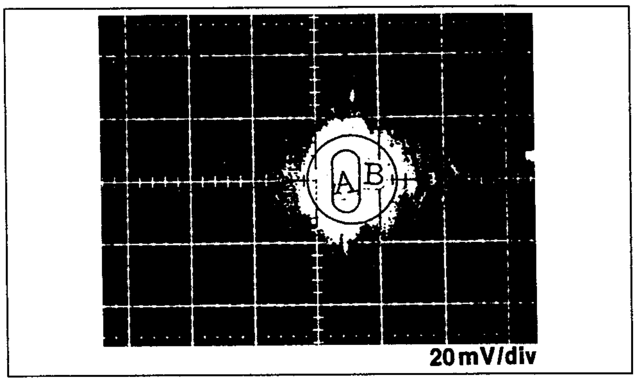


Fig. 22

COLOUR, TINT ADJUSTMENT (L-P.W. board)

1. EQUIPMENT TO USED

Video Generator (TG-7)
Oscilloscope

2. INITIALIZE CONDITION

Contrast Control	Max.
RGB Contrast Control	Max.
Brightness Control	Centre
Chroma Control	Centre
Tint Control	Centre

3. ADJUSTMENT PROCEDURE

1. Set the Input Selector switches to LINE A.
2. Input a Full Field Colour Bar signal to VIDEO input terminal.
3. Connect an oscilloscope to **TPKB** and **TPL2**.

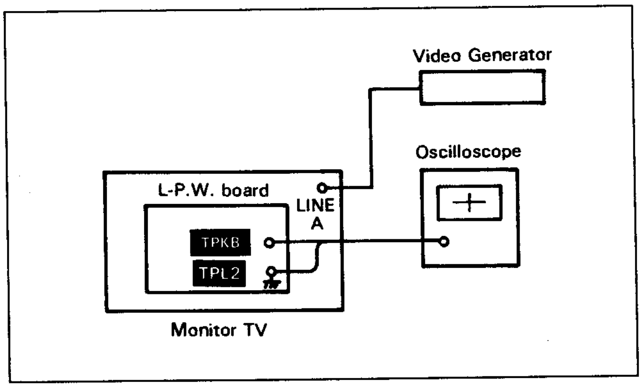


Fig. 23

4. Adjust R697 (Sub Colour) so that the waveform at **TPKB** becomes as shown in Fig. 24.

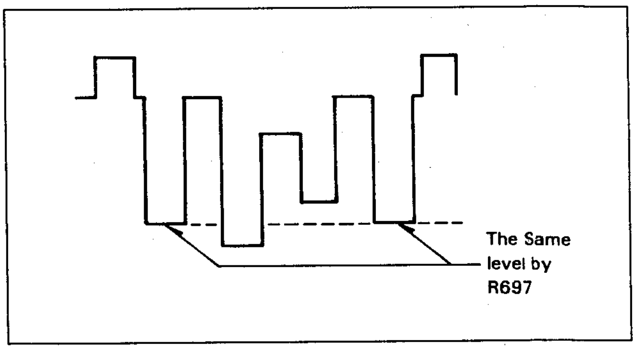


Fig. 24

5. Adjust R699 (Sub Tint) so that the waveform at **TPKB** becomes as shown in Fig. 25

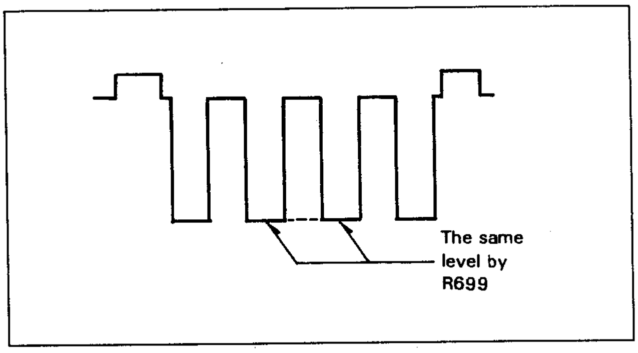


Fig. 25.

PURITY ADJUSTMENT

1. EQUIPMENT TO USED

Video Generator
External Degaussing Coil

2. ADJUSTMENT PROCEDURE

1. Operate the monitor over 30 minutes.
2. Fully degauss the picture tube by using an external degaussing Coil.
3. Set the Input Selector Switches to LINE A.
4. Input a video signal to VIDEO input terminal.
5. Roughly adjust the convergence by using the static and convergence magnets and deflection yoke.
6. Input a black and white signal to VIDEO input terminal.
7. Loosen clamp screw of the deflection yoke.

B. Slide the deflection yoke toward the picture tube.

9. Adjust the purity magnets so that red circle is obtained at the center of the picture.

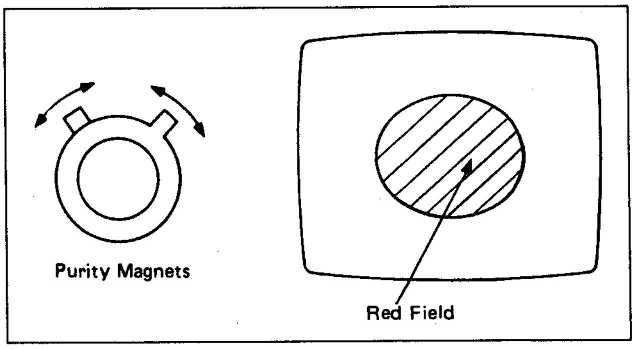


Fig. 26

10. Slide the deflection yoke toward you so that good purity is obtained.
11. Confirm the purity with a green and a blue screen.
12. Emit the Red, Green and Blue at the same time.
13. Confirm the white quality.
14. Tighten clamp screw when complete.

CONVERGENCE ADJUSTMENT

1. EOUIPMENT TO USED

Video Generator.

2. ADJUSTMENT PROCEDURE

1. Operate the monitor over 30 minutes.
2. Set the Input Selector Switch to LINE A.
3. Input a Cross Hatch patten signal to VIDEO input terminal.
4. Match the R and B at picture centre with four pole magnet.
   (Rotate the two ring magnets to move the red and blue dots Circularly in the opposite derection).
5. At the picture centre, match R and B to G with the six-pole magnet.

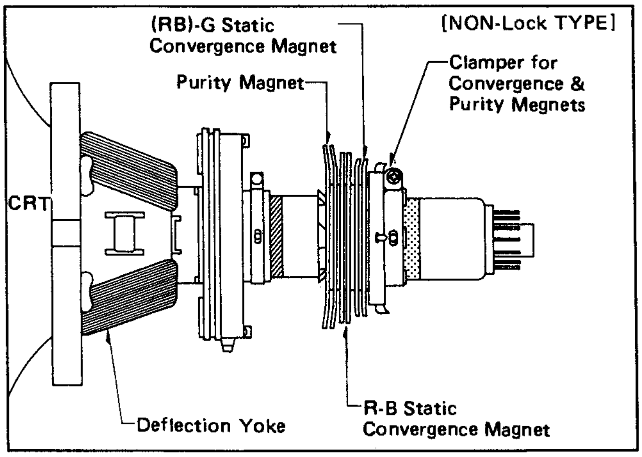

(RB)-G Static Convergence Magnet
[NON-Lock TYPE]
Purity Magnet
Clamper for Convergence & Purity Megnets
CRT
Deflection Yoke
R-B Static Convergence Magnet

Fig. 27

6. Tilt the DY up and down, match the R and B for H line of centre. (Fig. 28)
7. Tilt the DY left and right, match the R and B for H line of up and down side and V line of left and right side. (Fig. 29)

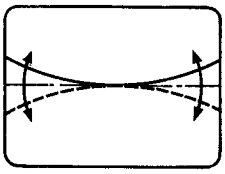


Fig. 29

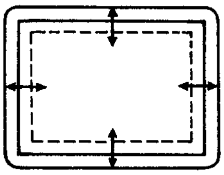


Fig. 29

8. When the periphery convergence is bad, fix the good point for convergence by inserting parmalloy.

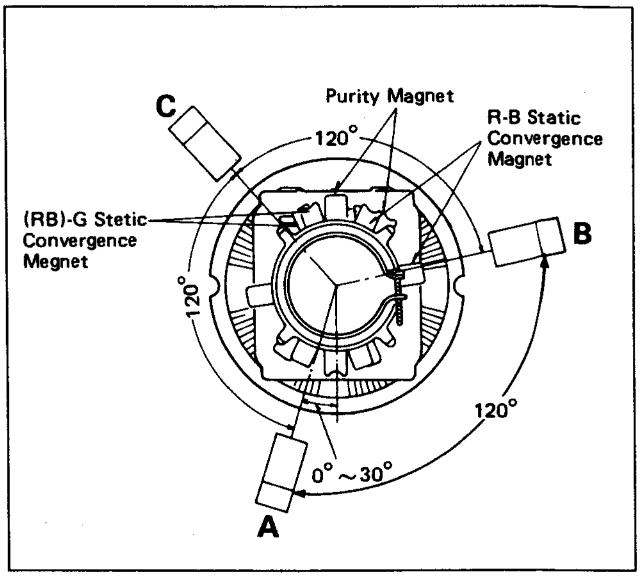

C
Purity Magnet
120°
R-B Static Convergence Magnet
(RB)-G Stetic Convergence Megnet
B
120°
120°
0° ~30°
A

Fig. 30

Notes:

1. Wedge A shown in Fig. 30 should be fixed within a range of 0° ~ 30° to the left of the vertical line as shown.
2. After inserting wedge A, insert wedges B and C. The wedges should be set 120° apart from each other.
3. Be certain that the four wedges are firmly fixed and the Deflection Yoke is tightly clamped in place. Otherwise the Deflection Yoke may shift it position and cause a loss of convergence and purity.

CUT OFF ADJUSTMENT (L-P.W. board)

1. EQUIPMENT TO USED

Oscilloscope

Video Generator

2. INITIALIZE CONDITION (D-P.W. boerd)

R3349 (R Drive)	Centre
R3351 (R Low Light)	Centre
R3366 (B Low Light)	Centre
R3339 (B Drive)	Centre

3. ADJUSTMENT PROCEDURE

1. Set the input selector switches to LINE A.
2. Input a Cross Hatch pattern signal to VIDEO input terminal.
3. Connect an Oscilloscope to TPKG, and earth.

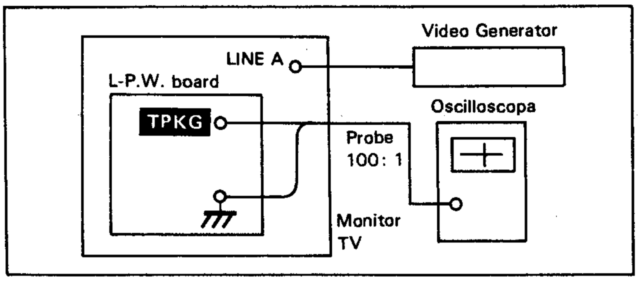


Fig. 31

4. Read the voltage (Black standard level to ground) on oscilloscope.
5. Adjust the Screen control on FBT so that the Black standard signal level is 110±3V.

Note: Black standard signal is output from the IC for auto white balance and appears after the vertical blanking pulse. Do not adjust at black level in video signal.

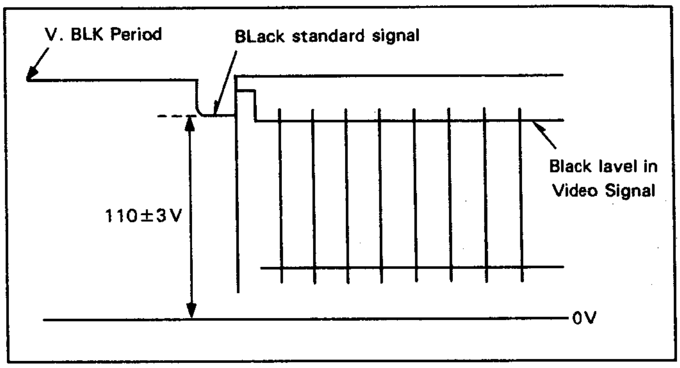


Fig. 23

WHITE BALANCE ADJUSTMENT (D-P.W. board)

1. EQUIPMENT TO USED

Video Generator

TV-Colour Analyzer (MINOLTA)

2. INITIALIZE CONDITION

Chroma Control	Centre
Phase Control	Centre
Contrast Control	Max.
Aperture Control	Centre
Brightness Control	Centre
RGB Contrast Control	Max.
R3317 (Sub. Brightness) R3349 (R. Drive) R3339 (B. Drive) R3351 (R. Low light) R3366 (B. Low light)	Centre

3. ADJUSTMENT PRDCEDURE

1. Operate the monitor over 30 minutes.
2. Apply a white pattern signal.
3. Adjust the brightness control so that the picture tube becomes faint light.
4. Adjust R3351 (R. Low light) and R3366 (B. Low light) so that the screen becomes uniform white.
5. Turn the brightness control fully clockwise.
6. Adjust R3349 (R. Drive) and R3339 (B. Drive) so that the screen beoomes uniform white.
7. Since the adjustment of steps 3 through 6 have mutual influence, be sure to repeat the followup adjustment.

SUB BRIGHTNESS ABL ADJUSTMENT (A/D-P.W. Board)

1. **EQUIPMENT TO USED**
   Video Generator
2. **INITIALIZE CONDITION**
   Contrast Control .... Max.
   RGB Contrast Control .... Max.
   Brightness Control .... Centre
3. **ADJUSTMENT PROCEDURE**
   1. Operate the monitor over 30 minutes.
   2. Set the Input Selector Switches to LINE A.
   3. Input SMPTE or cross hatch pattern signal to VIDEO input terminal.
   4. Adjust the sub-brightness control (R3317) until a first colour is dimly visible.

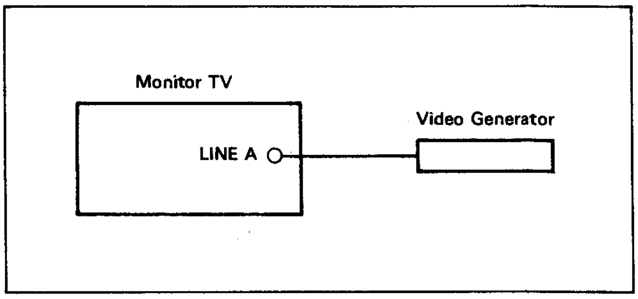


Fig. 33

FOCUS ADJUSTMENT

Adjust the focus control (on the FBT) to obtain the sharpest and clearest picture.

DEFLECTIDN ADJUSTMENT (A/E-P.W. board)

1. Set the Input Selector Switches to LINE A.
2. Set the overscan Switch to OFF.
3. Input a Monoscope pattern signal to LINE A input terminal.
4. Adjust R468 (V. Centre) so that the vertical picture position is oentre.
5. Adjust horizontal width by R563 (H. Size) so that the A=B=2.5±0.5 as shown in Fig. 34.

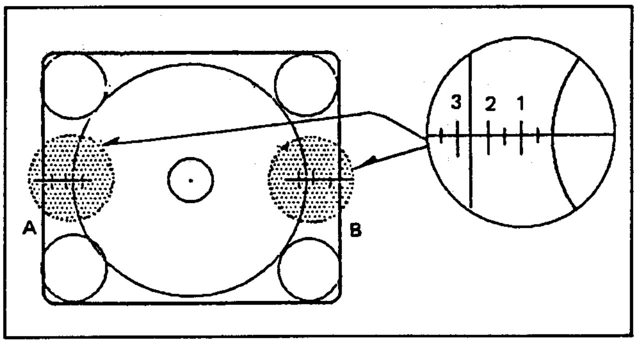


Fig. 34

6. Adjust vertical height by R402 (V. Size) so that the C=D=2.0±0.5 as shown in Fig. 35.

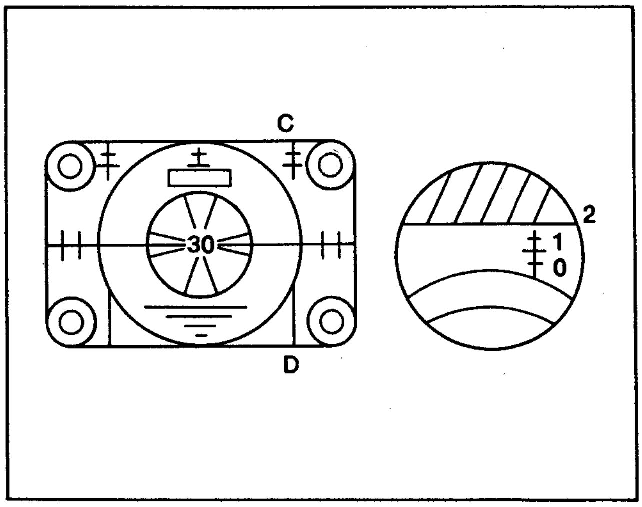
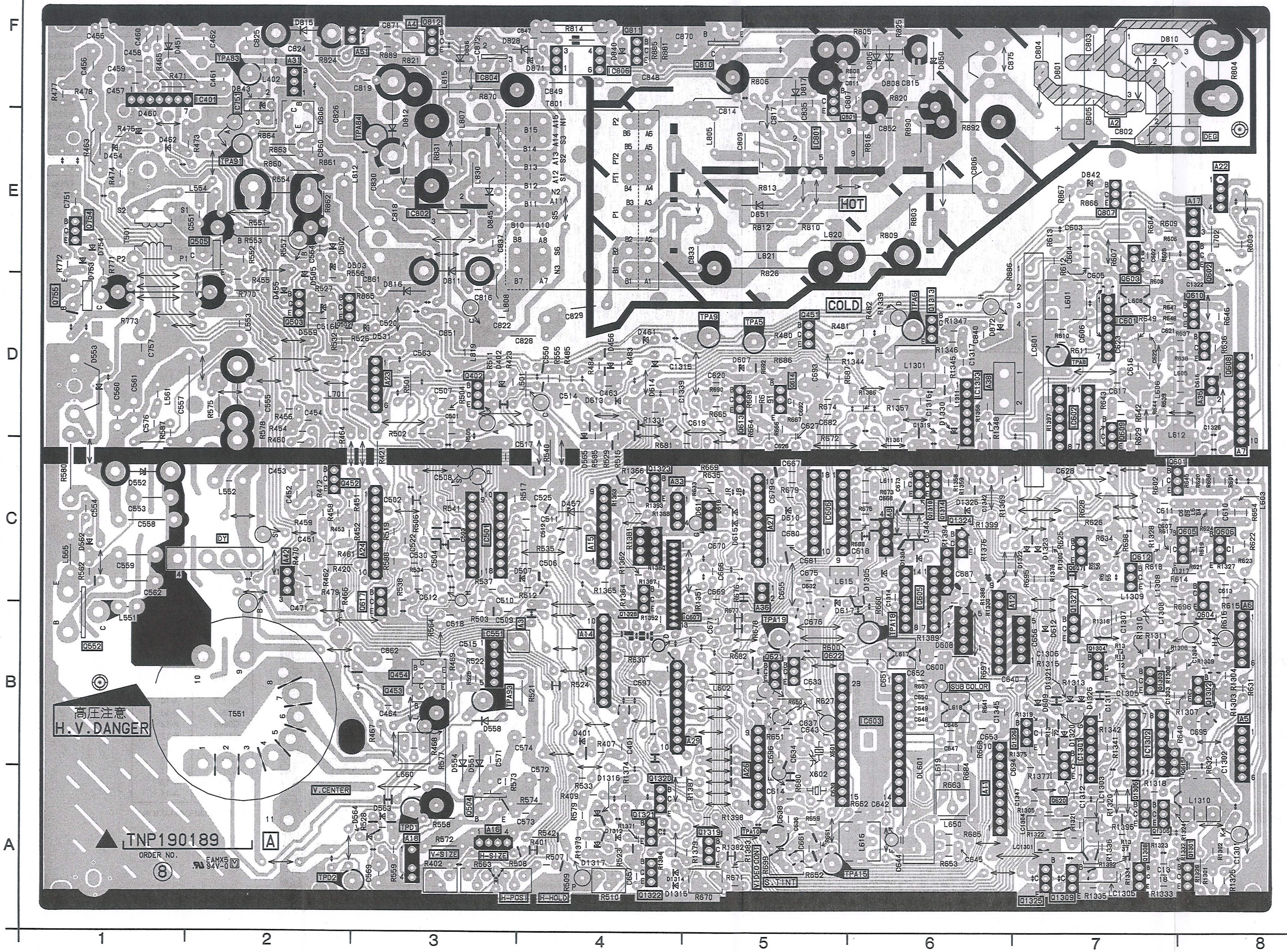


Fig. 35

7. Confirm that the picture is impartial to right and left.

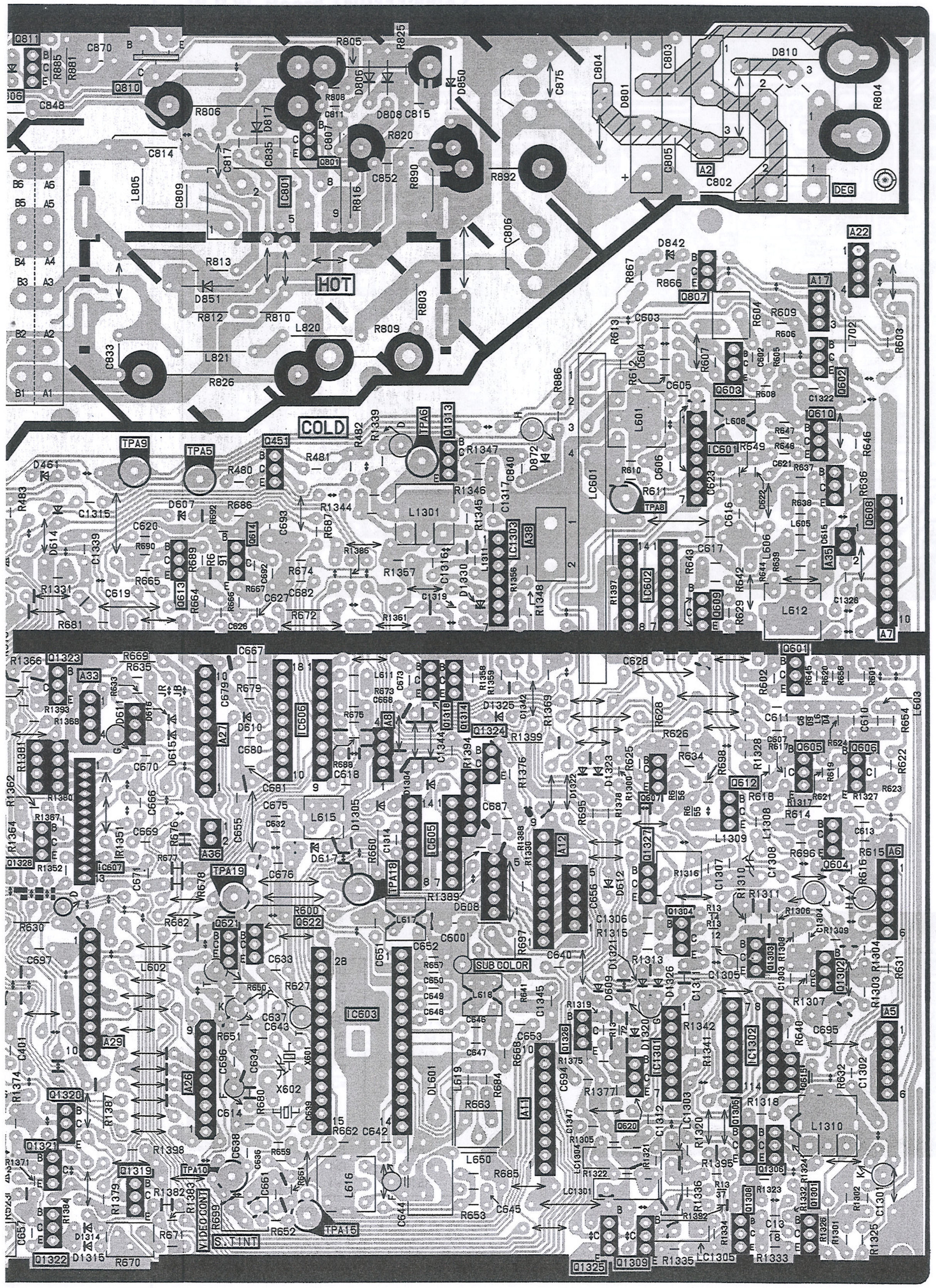
Circuit Boards

A-P.W. Board TNP190189FZ


F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
HOT
COLD
高圧注意
H.V.DANGER
TNP190189
ORDER NO.
8
A
V.CENTER
V-SIZE
H-SIZE
H-POSI
H-HOLD
SUB COLOR
VIDEO CONT
S.TINT

A-P.W. BOARD	
IC	
IC401	F-1
IC501	C-3
IC551	B-3
IC601	D-7
IC602	D-7
IC603	B-6
IC605	C-6
IC606	C-5
IC607	C-4
IC801	E-5
IC802	E-3
IC804	F-3
IC806	F-4
IC751	F-2
IC1301	B-7
IC1302	B-7
IC1303	D-6
TRANSISTOR	
Q402	D-3
Q451	D-5
Q452	C-2
Q453	B-3
Q454	B-4
Q502	D-2
Q503	D-2
Q504	A-3
Q505	E-2
Q552	B-1
Q601	C-7
Q602	E-8
Q603	E-7
Q604	C-8
Q605	C-7
Q606	C-8
Q607	C-7
Q608	D-8
Q609	D-7
Q610	D-8
Q612	C-7
Q613	D-5
Q614	D-5
Q617	C-3
Q620	A-7
Q621	B-5
Q622	B-5
Q754	E-1
Q755	D-1
Q801	F-5
Q806	E-2
Q807	E-7
Q810	F-5
Q811	F-4
Q812	F-3
Q1301	A-7
Q1302	B-8
Q1303	B-7
Q1304	B-7
Q1305	A-7
Q1306	A-7
Q1308	A-7
Q1309	A-7
Q1313	D-6
Q1314	C-6
Q1318	C-6
Q1319	A-5
Q1320	A-4
Q1321	A-4
Q1322	A-4
Q1323	C-4
Q1324	C-6
Q1325	A-7
Q1326	B-6
Q1327	B-7
Q1328	C-4
VR	
R402	A-3
R468	B-3
R508	A-3
R510	A-4
R563	A-3
R604	E-7
R663	A-6
R670	A-5
R697	B-6
R699	A-5
R1316	B-7
TP	
TPA5	D-5
TPA6	D-6
TPA8	D-7
TPA9	D-5
TPA10	A-5
TPA15	A-5
TPA18	B-6
TPA19	B-5
TPA83	F-2
TPA84	E-3
TPA91	E-2
TPA93	B-3
TPD1	A-3
TPD2	A-2

ADDRESS INFORMATION


HOT
COLD
SUB COLOR
VIDEO CONT
S.TINT
TPA5
TPA9
TPA10
TPA15
TPA19
5
6
7
8
9
10
11
12
13

A-P.W. BOARD

IC	
IC401	F-1
IC501	C-3
IC551	B-3
IC601	D-7
IC602	D-7
IC603	B-6
IC605	C-6
IC606	C-5
IC607	C-4
IC801	E-5
IC802	E-3
IC804	F-3
IC806	F-4
IC751	F-2
IC1301	B-7
IC1302	B-7
IC1303	D-6

TRANSISTOR	
Q402	D-3
Q451	D-5
Q452	C-2
Q453	B-3
Q454	B-4
Q502	D-2
Q503	D-2
Q504	A-3
Q505	E-2
Q552	B-1
Q601	C-7
Q602	E-8
Q603	E-7
Q604	C-8
Q605	C-7
Q606	C-8
Q607	C-7
Q608	D-8
Q609	D-7
Q610	D-8
Q612	C-7
Q613	D-5
Q614	D-5
Q617	C-3
Q620	A-7
Q621	B-5
Q622	B-5
Q754	E-1
Q755	D-1
Q801	F-5
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Q807	E-7
Q810	F-5
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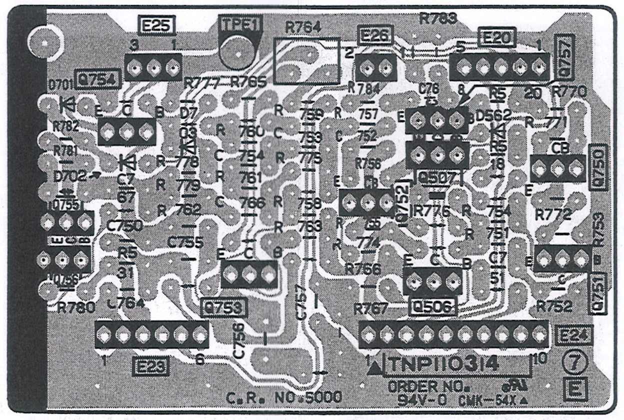
Q812	F-3
Q1301	A-7
Q1302	B-8
Q1303	B-7
Q1304	B-7
Q1305	A-7
Q1306	A-7
Q1308	A-7
Q1309	A-7
Q1313	D-6
Q1314	C-6
Q1318	C-6
Q1319	A-5
Q1320	A-4
Q1321	A-4
Q1322	A-4
Q1323	C-4
Q1324	C-6
Q1325	A-7
Q1326	B-6
Q1327	B-7
Q1328	C-4

VR	
R402	A-3
R468	B-3
R508	A-3
R510	A-4
R563	A-3
R604	E-7
R663	A-6
R670	A-5
R697	B-6
R699	A-5
R1316	B-7

TP	
TPA5	D-5
TPA6	D-6
TPA8	D-7
TPA9	D-5
TPA10	A-5
TPA15	A-5
TPA18	B-6
TPA19	B-5
TPA83	F-2
TPA84	E-3
TPA91	E-2
TPA93	B-3
TPD1	A-3
TPD2	A-2

ADDRESS INFORMATION

E-P.W. Board TNP110314DZ


E25
TPE1
R764
R783
E26
E20
Q757
Q754
Q755
Q753
Q506
Q507
Q750
Q751
E23
E24
TNP110314
ORDER NO.
94V-0
C.R. NO.5000
E

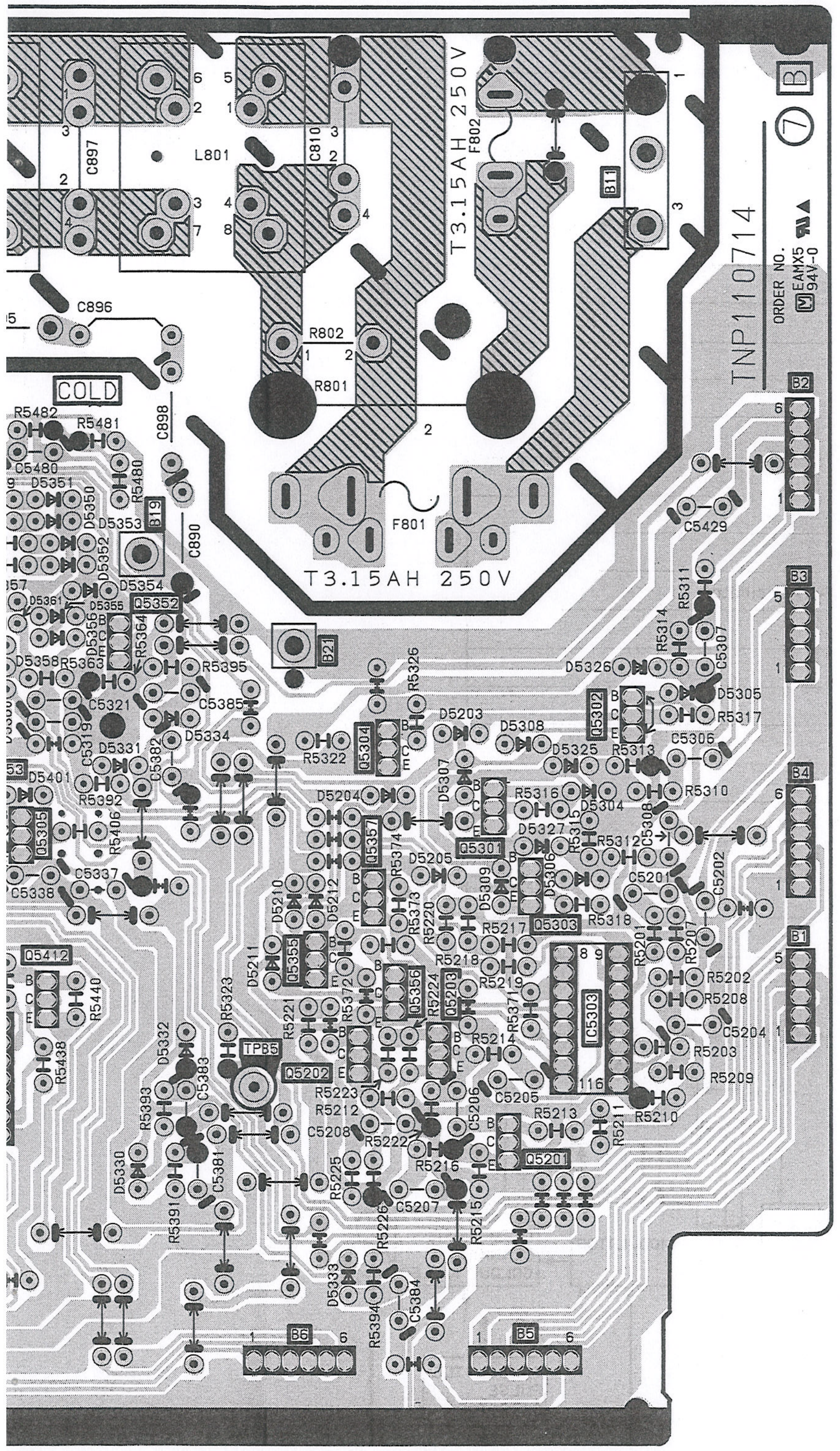
E-P.W. BOARD

TRANSISTOR	
Q750	F-13
Q751	E-13
Q752	E-12
Q753	E-12
Q754	F-11
Q755	E-11
Q756	E-11
Q757	F-12
Q506	E-12
Q507	F-12

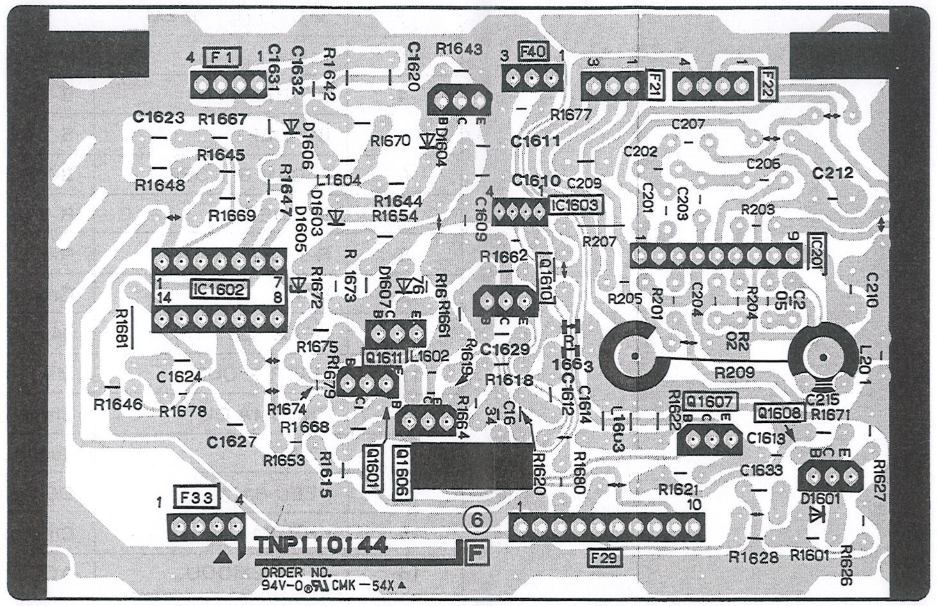
VR	
R764	F-12

TP	
TPE1	F-12

ADDRESS INFORMATION


COLD
T3.15AH 250V
TNP110714
ORDER NO.
EAMX5
94V-0
L801
F801
F802
R801
R802
⑦
B
3
4
5
6
7
8
9

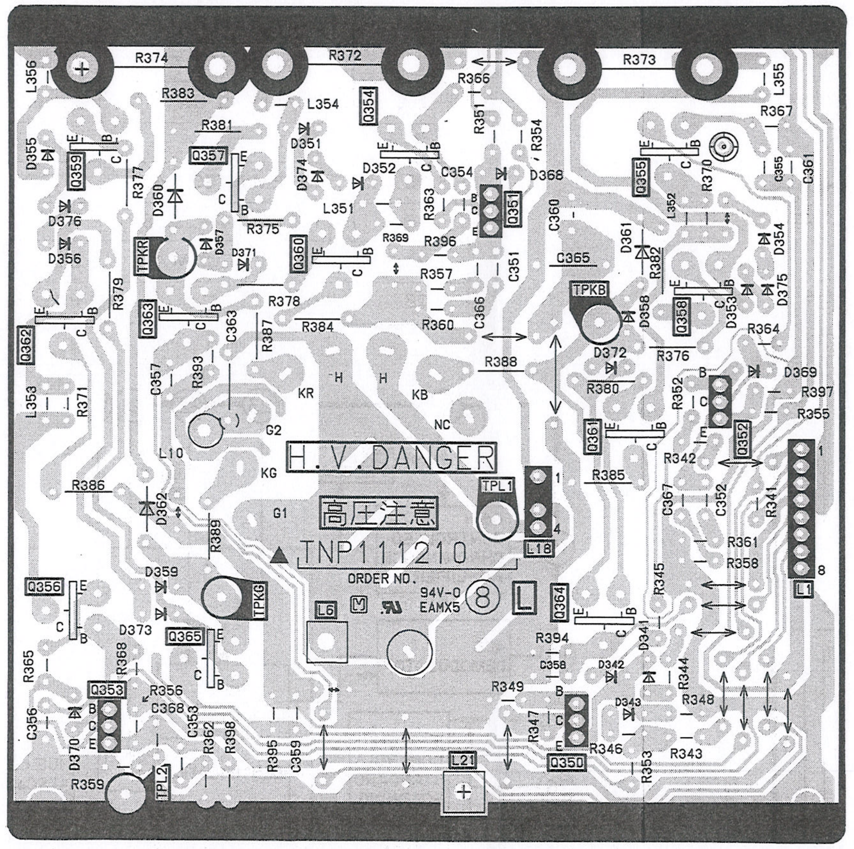
F-P.W. Board TNP110144CZ


TNP110144
ORDER NO.
94V-0
CMK－54X
IC1602
IC1603
IC201
F1
F33
F40
F21
F22
F29
⑥
F

F-P.W. BOARD	
IC	
IC201	E-9
IC1602	E-7
IC1603	E-8
TRANSISTOR	
Q1601	E-8
Q1605	D-8
Q1607	D-9
Q1608	D-9
Q1610	E-8
Q1611	E-8

ADDRESS INFORMATION

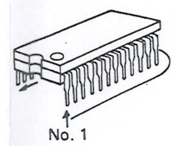
L-P.W. Board TNP111210ZA


H.V. DANGER
高圧注意
TNP111210
ORDER NO.
94V-0
EAMX5
⑧
L
TPKR
TPKG
TPKB
TPL1
TPL2
L1
L6
L18
L21

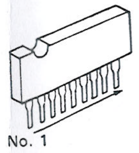
L-P.W. BOARD	
TRANSISTOR	
Q350	A-8
Q351	C-8
Q352	B-8
Q353	A-7
Q354	C-7
Q355	C-8
Q356	A-7
Q357	C-7
Q358	B-8
Q359	C-7
Q360	B-7
Q361	B-8
Q362	B-7
Q363	B-7
Q364	A-8
Q365	A-7
TP	
TPKR	B-7
TPKG	A-7
TPKB	B-8
TPL1	B-8
TPL2	A-7

ADDRESS INFORMATION

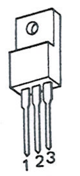
TERMINAL GUIDE OF IC'S, TRANSISTORS, DIODES



CXA1024S : 48Pin
TDA4555 : 28Pin
TDA2579A : 18Pin
AN5613 : 18Pin
TC4052BP : 16Pin
MC14066BCP : 14Pin
AN5860 : 14Pin
SN74LS86AN : 14Pin
AN6912 : 14Pin
AN4558 : 8Pin
TLP634GR : 6Pin



AN5265 : 9Pin



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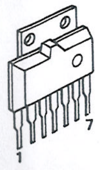
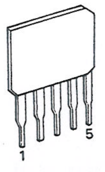
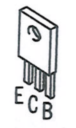
UPC2412HF
AN78M20
S1854LBM-6



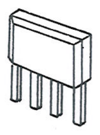
AN5521



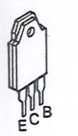
TNH11303



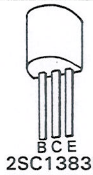
2SA1698RL
2SC2497AR



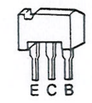
AN608P



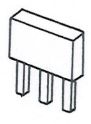
2SD1732LBTV



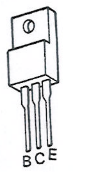
2SC1383R
2SA564AR



UN4211
UN4212

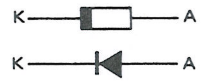


2SA1309AQ
2SC3311AR



2SC3942RL
2SC3063
2SC2653HLB
2SA879
2SA683R
2SD1264RL
2SD1499QLB

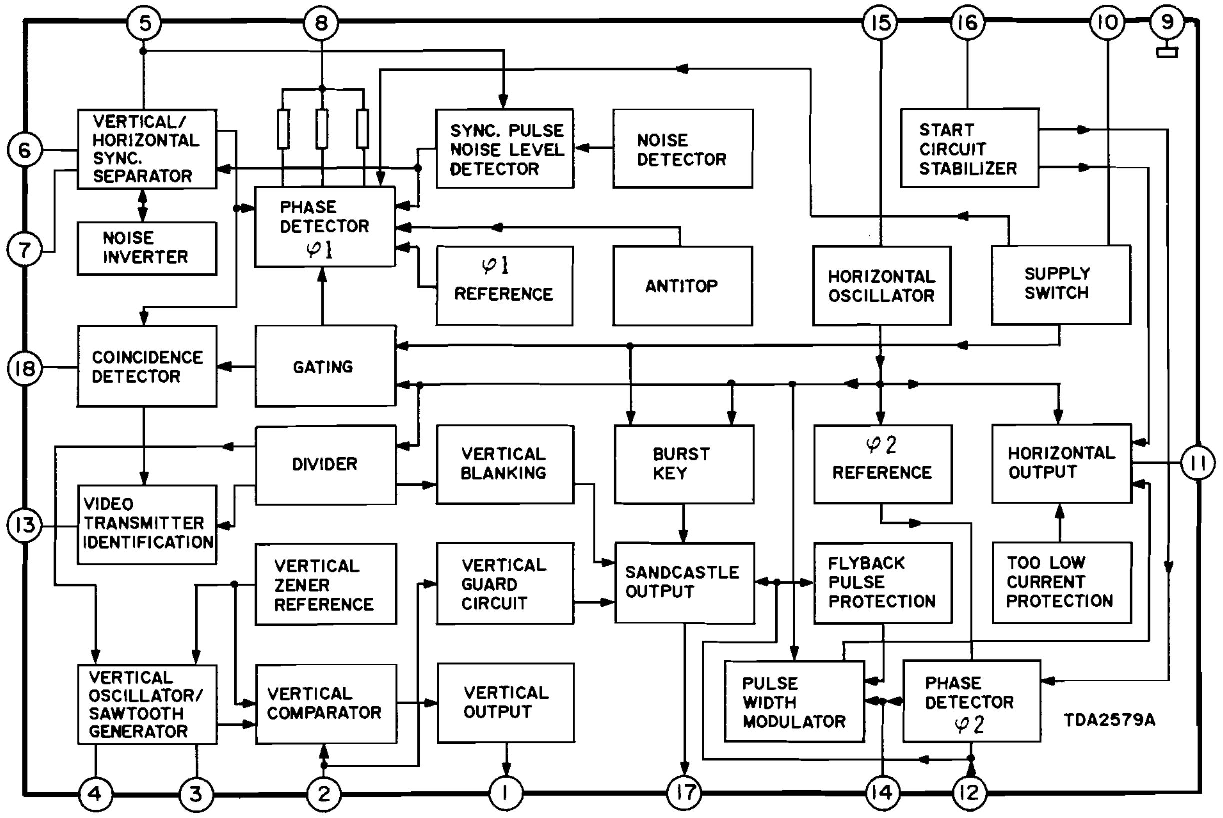
Diode



IC Function of Terminal and Equivalent Circuit

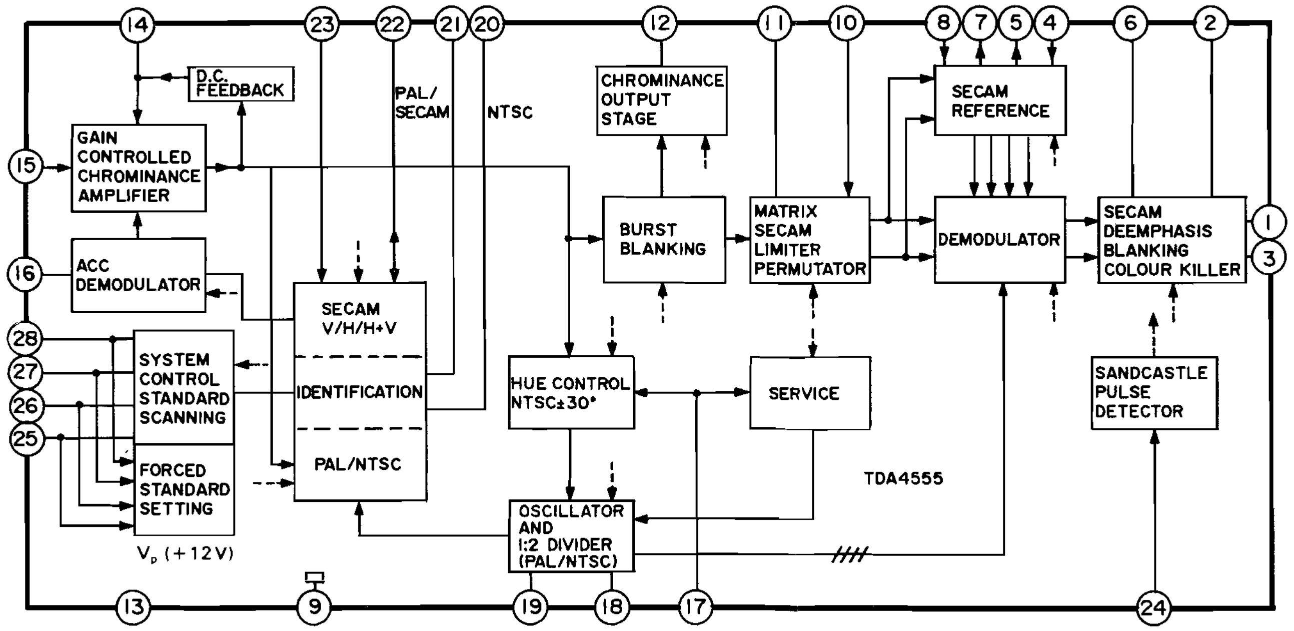
IC501 TDA2579A

PIN NO.	MARK	FUNCTION
1	V. OUT	Vertical Output.
2	V. FEED BACK	
3		Vertical ramp generator
4		Vertical amplitude
5		Video signal input.
6		Black level
7	SYNC SEP.	
8	AFC	
9	GND	Ground.
10	Vcc	Supply Voltage
11	H. DRIVE	Horizontal drive output.
12	FBP	Flyback pulse input
13	50/60	
14		Horizontal portion
15		Horizontal OSC.
16		Starter
17	SANDC. OUT	Standcastle output
18		AFC


5
8
15
16
10
9
6
7
18
13
11
VERTICAL/ HORIZONTAL SYNC. SEPARATOR
NOISE INVERTER
PHASE DETECTOR φ1
SYNC. PULSE NOISE LEVEL DETECTOR
NOISE DETECTOR
START CIRCUIT STABILIZER
φ1 REFERENCE
ANTITOP
HORIZONTAL OSCILLATOR
SUPPLY SWITCH
COINCIDENCE DETECTOR
GATING
VIDEO TRANSMITTER IDENTIFICATION
DIVIDER
VERTICAL BLANKING
BURST KEY
φ2 REFERENCE
HORIZONTAL OUTPUT
VERTICAL ZENER REFERENCE
VERTICAL GUARD CIRCUIT
SANDCASTLE OUTPUT
FLYBACK PULSE PROTECTION
TOO LOW CURRENT PROTECTION
VERTICAL OSCILLATOR/ SAWTOOTH GENERATOR
VERTICAL COMPARATOR
VERTICAL OUTPUT
PULSE WIDTH MODULATOR
PHASE DETECTOR φ2
TDA2579A
4
3
2
1
17
14
12

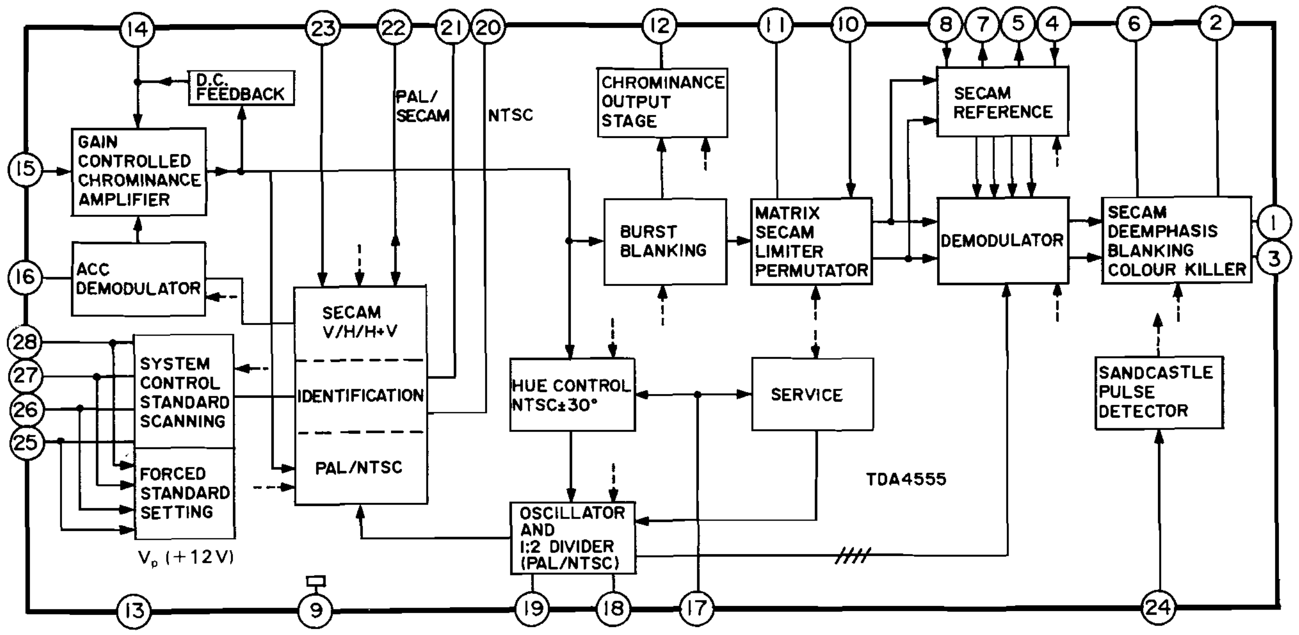
IC603 TDA4555

PIN NO.	MARK	FUNCTION
1	– (R-Y)	– (R-Y) Output
2	SECAM R-Y DEEM	R-Y SECAM deemphasis.
3	– (B-Y)	– (B-Y) Output.
4	B-Y REF	B-Y SECAM reference input.
5	B-Y REF	B-Y SECAM reference output.
6	SECAM B-Y DEEM	B-Y SECAM deemphasis.
7	R-Y REF	R-Y SECAM reference output.
8	R-Y REF	R-Y SECAM reference input.
9	EARTH	Ground.
10	DELAYED IN	64μs delay input.
11	MATRIX OUT	MATRIX SECAM limiter output.
12	CHROMA OUT	Chrominance output.
13	12V	Supply Voltage 12V.
14	FEED BACK FILTER	DC feedback.
15	CHROMA IN	Chrominance input.
16	AGC DEMODU.	AGC demodulator.
17	SERVICE (TINT)	Hue control.
18	CLK	PLL
19	CLK	7.16 MHz (NTSC) 8.86 MHz (PAL) Oscillator.
20	NTSC SYSTEM F.	NTSC identification.
21	P/S SYSTEM F.	PAL/SECAM identification.
22	SECAM IDENT ADJ.	SECAM identification reference.
23	SECAM SYS. SW	Ground.
24	SAND	Sandcastle pulse input.
25	SYSTEM NTSC 4.43	NTSC 4.43 MHz recognize input/output.
26	SYSTEM NTSC 3.58	NTSC 3.58 MHz recognize input/output.
27	SYSTEM SECAM	SECAM recognize input/output.
28	SYSTEM PAL	PAL recognize input/output.


14
23
22
21
20
12
11
10
8
7
5
4
6
2
D.C. FEEDBACK
PAL/ SECAM
NTSC
CHROMINANCE OUTPUT STAGE
SECAM REFERENCE
15
GAIN CONTROLLED CHROMINANCE AMPLIFIER
BURST BLANKING
MATRIX SECAM LIMITER PERMUTATOR
DEMODULATOR
SECAM DEEMPHASIS BLANKING COLOUR KILLER
1
3
16
ACC DEMODULATOR
SECAM V/H/H+V
IDENTIFICATION
PAL/NTSC
28
27
26
25
SYSTEM CONTROL STANDARD SCANNING
FORCED STANDARD SETTING
HUE CONTROL NTSC±30°
SERVICE
SANDCASTLE PULSE DETECTOR
TDA4555
OSCILLATOR AND 1:2 DIVIDER (PAL/NTSC)
V_p (+12V)
13
9
19
18
17
24

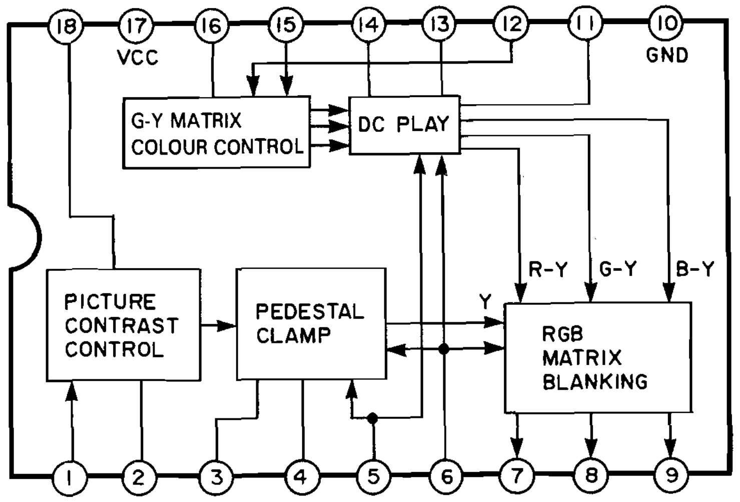
IC603 TDA4555

PIN NO.	MARK	FUNCTION
1	– (R-Y)	– (R-Y) Output
2	SECAM R-Y DEEM	R-Y SECAM deemphasis.
3	– (B-Y)	– (B-Y) Output.
4	B-Y REF	B-Y SECAM reference input.
5	B-Y REF	B-Y SECAM reference output.
6	SECAM B-Y DEEM	B-Y SECAM deemphasis.
7	R-Y REF	R-Y SECAM reference output.
8	R-Y REF	R-Y SECAM reference input.
9	EARTH	Ground.
10	DELAYED IN	64μs delay input.
11	MATRIX OUT	MATRIX SECAM limiter output.
12	CHROMA OUT	Chrominance output.
13	12V	Supply Voltage 12V.
14	FEED BACK FILTER	DC feedback.
15	CHROMA IN	Chrominance input.
16	AGC DEMODU.	AGC demodulator.
17	SERVICE (TINT)	Hue control.
18	CLK	PLL
19	CLK	7.16 MHz (NTSC) 8.86 MHz (PAL) Oscillator.
20	NTSC SYSTEM F.	NTSC identification.
21	P/S SYSTEM F.	PAL/SECAM identification.
22	SECAM IDENT ADJ.	SECAM identification reference.
23	SECAM SYS. SW	Ground.
24	SAND	Sandcastle pulse input.
25	SYSTEM NTSC 4.43	NTSC 4.43 MHz recognize input/output.
26	SYSTEM NTSC 3.58	NTSC 3.58 MHz recognize input/output.
27	SYSTEM SECAM	SECAM recognize input/output.
28	SYSTEM PAL	PAL recognize input/output.


D.C. FEEDBACK
GAIN CONTROLLED CHROMINANCE AMPLIFIER
ACC DEMODULATOR
SYSTEM CONTROL STANDARD SCANNING
FORCED STANDARD SETTING
V$_p$ (+12V)
PAL/ SECAM
NTSC
SECAM V/H/H+V
IDENTIFICATION
PAL/NTSC
CHROMINANCE OUTPUT STAGE
BURST BLANKING
HUE CONTROL NTSC±30°
OSCILLATOR AND 1:2 DIVIDER (PAL/NTSC)
MATRIX SECAM LIMITER PERMUTATOR
SERVICE
SECAM REFERENCE
DEMODULATOR
SECAM DEEMPHASIS BLANKING COLOUR KILLER
SANDCASTLE PULSE DETECTOR
TDA4555

IC606 AN5613

PIN NO.	MARK	FUNCTION
1	Y IN	Luminance (Y) signal input.
2	PICTURE	Picture control.
3	Y CLAMP	Y clamp condensor.
4	BRIGHT	Brightness control.
5	CLAMP	Pedestal clamp pulse input.
6	BLK	Blanking pulse input.
7	R OUT	R signal output.
8	G OUT	G signal output.
9	B OUT	B signal output.
10	GND	Ground.
11	(B-Y) C	B-Y clamp condensor.
12	(B-Y) IN	B-Y signal input.
13	(G-Y) CLAMP	G-Y clamp condensor.
14	(R-Y) C	R-Y clamp condensor.
15	(R-Y) IN	R-Y signal input.
16	COLOUR	Colour control.
17	Vcc	Supply voltage.
18	CONT.	Contrast control.


VCC
GND
G-Y MATRIX COLOUR CONTROL
DC PLAY
R-Y
G-Y
B-Y
Y
PICTURE CONTRAST CONTROL
PEDESTAL CLAMP
RGB MATRIX BLANKING

IC3301 CXA1024S

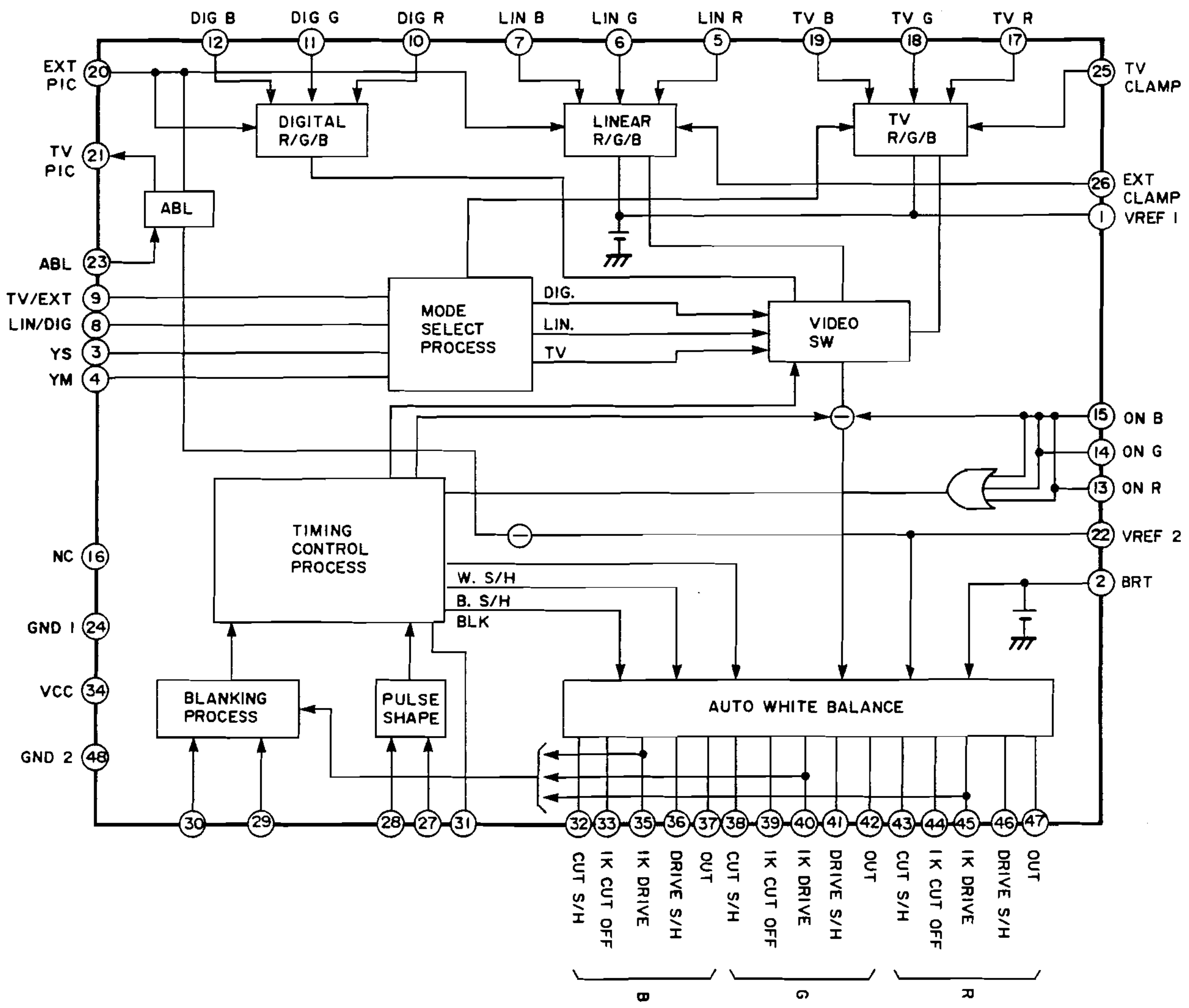
PIN NO.	MARK	FUNCTION
1	VREF1	Clamp standard voltage.
2	VREF2	Detect standard voltage.
3	YM	YM switch control.
4	Ys	Ys switch control.
5	LIN R	R, G, B signal input at Linear input mode.
6	LIN G	
7	LIN B	
8	LIN/DIG	Linear/Digital input mode select control.
9	TV/EXT	TV/EXT (Lin./Dig.) input mode select control.
10	DIG R	R, G, B signal input at Digital input mode.
11	DIG G	
12	DIG B	
13	ON R	R, G, B signal input at On screen display.
14	ON G	
15	ON B	
16	NC	Not connected.
17	TV R	R, G, B signal input at TV input mode.
18	TV G	
19	TV B	
20	EXT PIC	Picture control for Ext. signal (Lin./Dig.).
21	NC	Not connected.
22	BRT	Brightness control.
23	ABL	Decrease the picture and brightness control gain by DC voltage for inputed ABL. (PIC ABL : Less than 4.5V, BRT ABL : Less than 2.0V)
24	GND1	Ground.
25	TV CLAMP	Clamp timing pulse input for TV input terminal.
26	EXT CLAMP	Clamp timing pulse input for Linear input terminal.
27	H. PULSE	Horizontal pulse input.
28	V. PULSE	Vertical pulse input.
29	MUTE	Terminal determined video mute time at SW on.
30	BLK	Blanking terminal for all period.
31	SW	ON/OFF output for Drive IK resistor.
32	B CUT S/H	Sample hold terminal for cut off control.
38	G CUT S/H	
43	R CUT S/H	
33	B IK CUT OFF	IK input (Cut off control for signal output).
39	G IK CUT OFF	
44	R IK CUT OFF	
34	Vcc	Supply voltage.
35	B IK DRIVE	IK input (Drive control for signal output).
40	G IK DRIVE	
45	R IK DRIVE	
36	B DRIVE S/H	Sample hold terminal for drive control.
41	G DRIVE S/H	
46	R DRIVE S/H	
37	B OUT	R, G, B signal output.
42	G OUT	
47	R OUT	
48	GND2	Ground.

Input/Output Truth Value Table

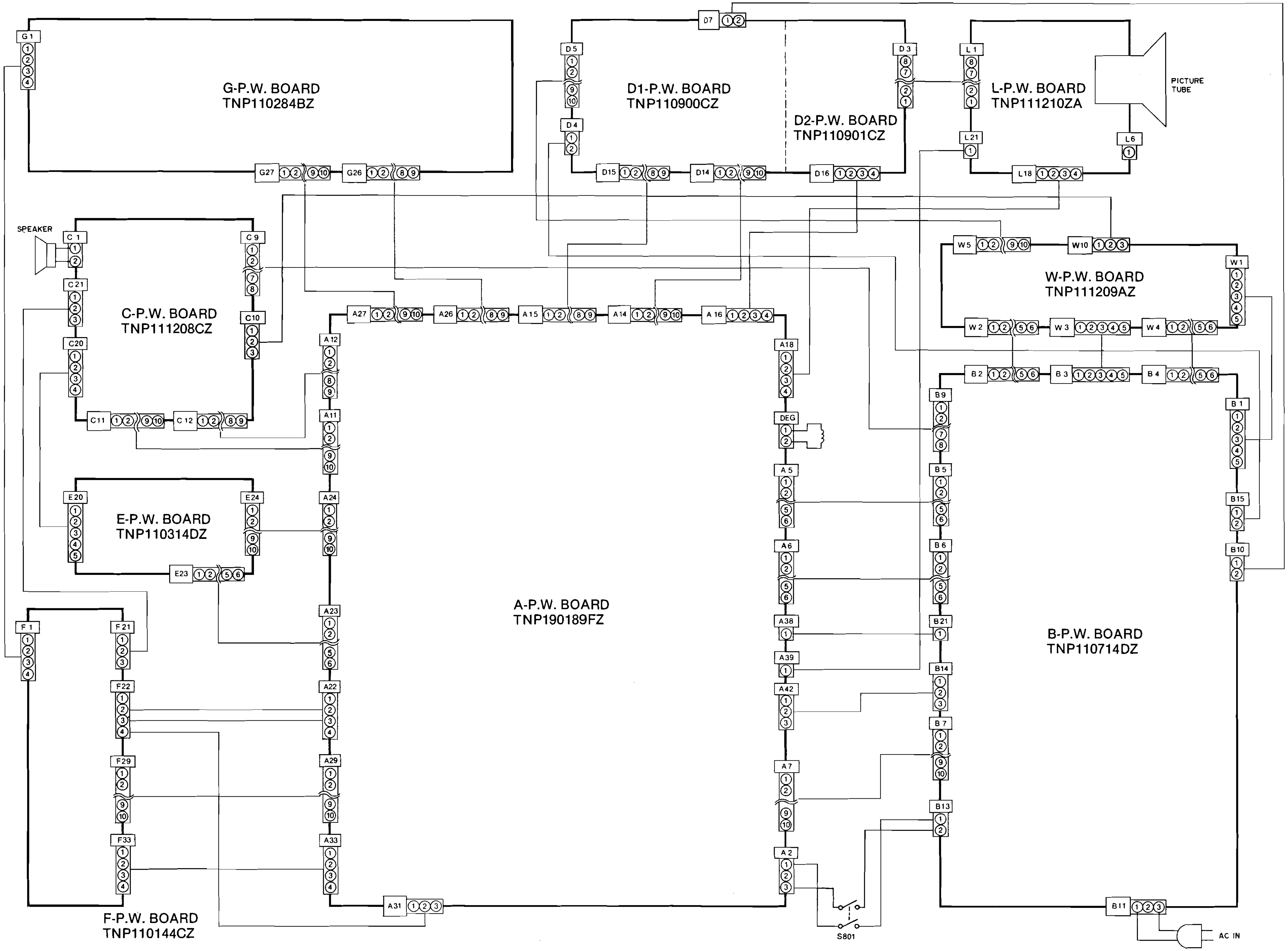
TV/EXT	H	L			
LIN/DIG	X	H			L
Ys	X	L		H	X
YM	X	L	H	X	X
Control / Mode	TV	TV	TV −6dB	LIN	DIG

LIN : Linear
DIG : Digital

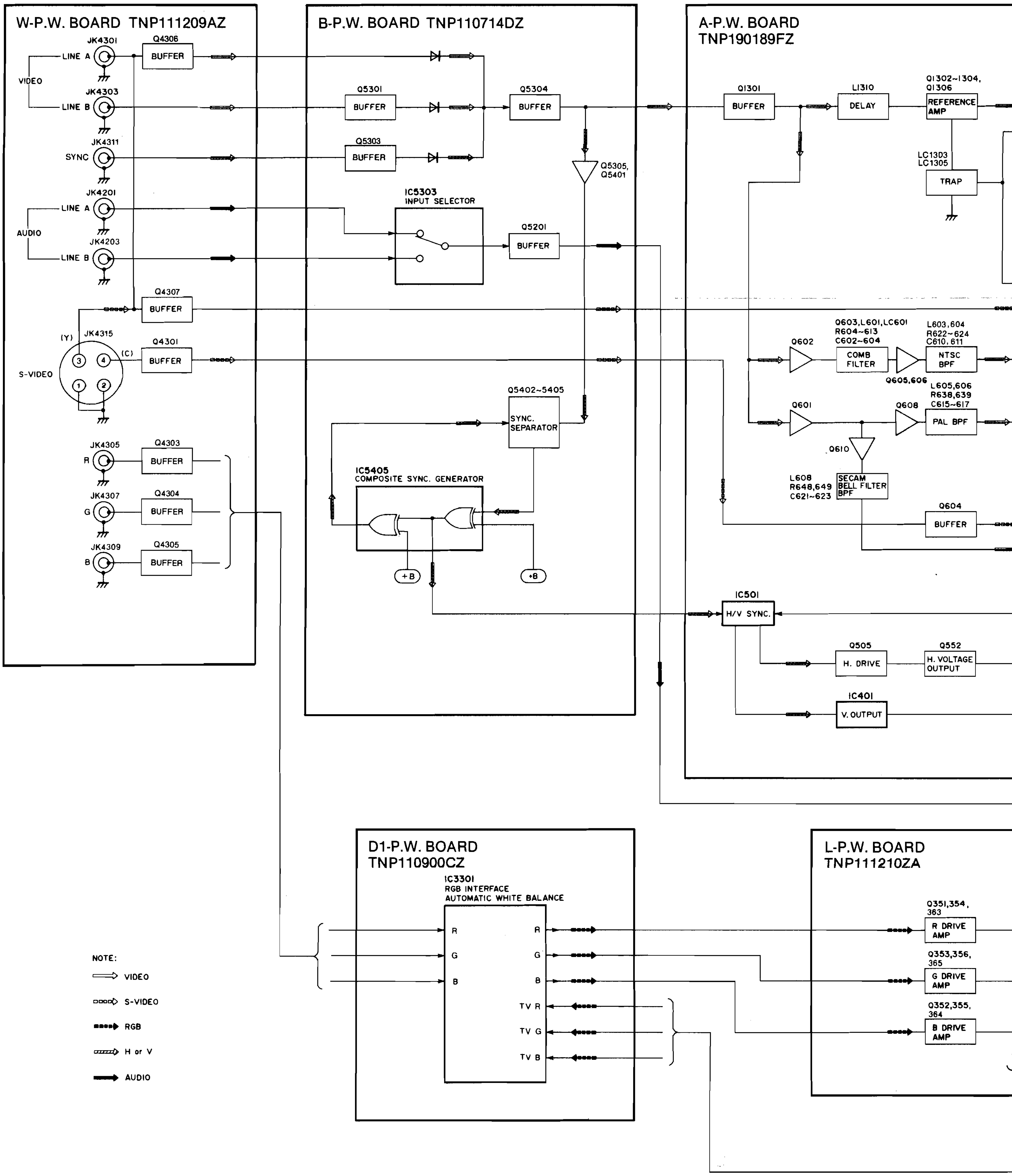
IC3301 CXA1024S

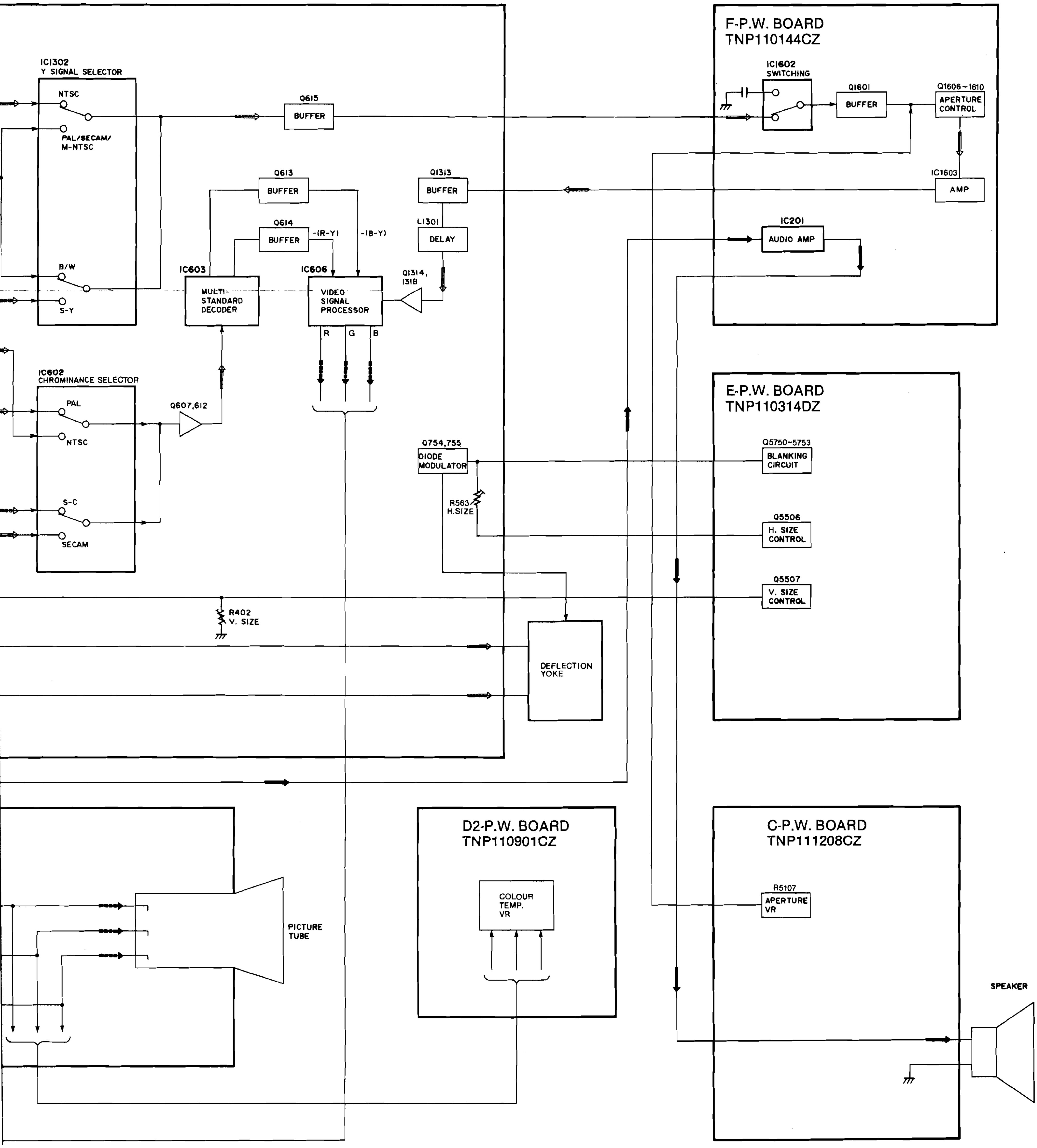

DIG B
DIG G
DIG R
LIN B
LIN G
LIN R
TV B
TV G
TV R
12
11
10
7
6
5
19
18
17
EXT PIC 20
TV PIC 21
ABL 23
TV/EXT 9
LIN/DIG 8
YS 3
YM 4
NC 16
GND 1 24
VCC 34
GND 2 48
25 TV CLAMP
26 EXT CLAMP
1 VREF 1
15 ON B
14 ON G
13 ON R
22 VREF 2
2 BRT
DIGITAL R/G/B
LINEAR R/G/B
TV R/G/B
ABL
MODE SELECT PROCESS
DIG.
LIN.
TV
VIDEO SW
TIMING CONTROL PROCESS
W. S/H
B. S/H
BLK
BLANKING PROCESS
PULSE SHAPE
AUTO WHITE BALANCE
30
29
28
27
31
32
33
35
36
37
38
39
40
41
42
43
44
45
46
47
CUT S/H
IK CUT OFF
IK DRIVE
DRIVE S/H
OUT
CUT S/H
IK CUT OFF
IK DRIVE
DRIVE S/H
OUT
CUT S/H
IK CUT OFF
IK DRIVE
DRIVE S/H
OUT
B
G
R

Interconnections


G-P.W. BOARD
TNP110284BZ
D1-P.W. BOARD
TNP110900CZ
D2-P.W. BOARD
TNP110901CZ
L-P.W. BOARD
TNP111210ZA
PICTURE TUBE
SPEAKER
C-P.W. BOARD
TNP111208CZ
W-P.W. BOARD
TNP111209AZ
E-P.W. BOARD
TNP110314DZ
A-P.W. BOARD
TNP190189FZ
B-P.W. BOARD
TNP110714DZ
F-P.W. BOARD
TNP110144CZ
G1
G27
G26
D7
D5
D4
D3
D15
D14
D16
L1
L21
L6
L18
C1
C9
C21
C10
C20
C11
C12
W5
W10
W1
W2
W3
W4
A27
A26
A15
A14
A16
A12
A11
A24
A23
A22
A29
A33
A31
A18
DEG
A5
A6
A38
A39
A42
A7
A2
B2
B3
B4
B9
B1
B5
B15
B6
B10
B21
B14
B7
B13
B11
E20
E24
E23
F1
F21
F22
F29
F33
S801
AC IN

Block Diagram


W-P.W. BOARD TNP111209AZ
JK4301
Q4306
LINE A
BUFFER
VIDEO
JK4303
LINE B
JK4311
SYNC
JK4201
LINE A
AUDIO
JK4203
LINE B
Q4307
BUFFER
(Y)
JK4315
Q4301
(C)
BUFFER
S-VIDEO
3
4
1
2
JK4305
Q4303
R
BUFFER
JK4307
Q4304
G
BUFFER
JK4309
Q4305
B
BUFFER
B-P.W. BOARD TNP110714DZ
Q5301
BUFFER
Q5304
BUFFER
Q5303
BUFFER
Q5305,
Q5401
IC5303
INPUT SELECTOR
Q5201
BUFFER
Q5402~5405
SYNC.
SEPARATOR
IC5405
COMPOSITE SYNC. GENERATOR
+B
+B
A-P.W. BOARD
TNP190189FZ
Q1301
BUFFER
L1310
DELAY
Q1302~1304,
Q1306
REFERENCE
AMP
LC1303
LC1305
TRAP
Q603,L601,LC601
R604~613
C602~604
L603,604
R622~624
C610,611
Q602
COMB
FILTER
NTSC
BPF
Q605,606
L605,606
R638,639
C615~617
Q601
Q608
PAL BPF
Q610
L608
R648,649
C621~623
SECAM
BELL FILTER
BPF
Q604
BUFFER
IC501
H/V SYNC.
Q505
H. DRIVE
Q552
H. VOLTAGE
OUTPUT
IC401
V. OUTPUT
D1-P.W. BOARD
TNP110900CZ
IC3301
RGB INTERFACE
AUTOMATIC WHITE BALANCE
R
G
B
R
G
B
TV R
TV G
TV B
L-P.W. BOARD
TNP111210ZA
Q351,354,
363
R DRIVE
AMP
Q353,356,
365
G DRIVE
AMP
Q352,355,
364
B DRIVE
AMP
NOTE:
VIDEO
S-VIDEO
RGB
H or V
AUDIO


IC1302
Y SIGNAL SELECTOR
NTSC
PAL/SECAM/
M-NTSC
B/W
S-Y
Q615
BUFFER
Q613
BUFFER
Q614
BUFFER
-(R-Y)
-(B-Y)
Q1313
BUFFER
L1301
DELAY
IC603
MULTI-
STANDARD
DECODER
IC606
VIDEO
SIGNAL
PROCESSOR
Q1314,
1318
R
G
B
IC602
CHROMINANCE SELECTOR
PAL
NTSC
S-C
SECAM
Q607,612
Q754,755
DIODE
MODULATOR
R563
H.SIZE
R402
V. SIZE
DEFLECTION
YOKE
PICTURE
TUBE
F-P.W. BOARD
TNP110144CZ
IC1602
SWITCHING
Q1601
BUFFER
Q1606~1610
APERTURE
CONTROL
IC1603
AMP
IC201
AUDIO AMP
E-P.W. BOARD
TNP110314DZ
Q5750~5753
BLANKING
CIRCUIT
Q5506
H. SIZE
CONTROL
Q5507
V. SIZE
CONTROL
D2-P.W. BOARD
TNP110901CZ
COLOUR
TEMP.
VR
C-P.W. BOARD
TNP111208CZ
R5107
APERTURE
VR
SPEAKER

Schematic Diagram

Important safety notice

Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Notes :

1. **Resistor**
All resistors are carbon 1/4W resistor, unless marked as follows :
Unit of resistance is OHM [Ω] (K=1,000 , M=1,000,000).
○ : Nonflammable
△ : Solid
◪ : Wire Wound
⊠ : Metal Oxide
◎ : Metal Film
⊗ : Fuse

2. **Capacitor**
All capacitors are ceramic 50V capacitor, unless marked as follows :
Unit of capacitance is µF, unless otherwise noted.
⊗ : Temperature Compensation
Ⓜ : Polyester
ⓜ : Metalized Polyester
⊠ : Polypropylene
+‖- : Electrolytic
NP‖ : Bipolar
Ⓣ : Dipped Tantalum
Ⓩ : Z-Type

3. **Coil**
Unit of inductance is µH, unless otherwise noted.

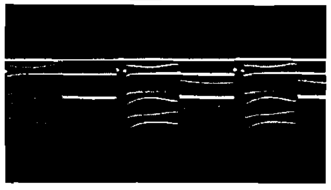
4. **Test Point**
● : Test Point position

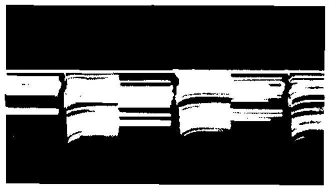
5. Voltage Measurement
Voltage is measured by an electronic voltmeter receiving rainbow color
to fully clockwise position.

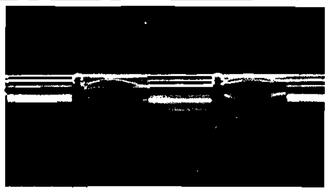
6. This schematic diagram is the latest at the time of printing and subject

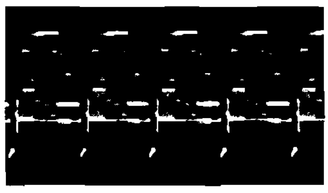
7. ——— **Positive voltage lines**
⇨ Video signal
▭▭▭▷ S-Video signal
■■■▶ RGB signal
▨▨▨▷ V or H output signal
━━▶ Audio signal

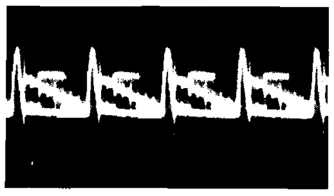
8. Switches
S801 : Power switch in OFF position.
S3301 : Level switch.
S4302 : Inpedance selector switch in 75Ω.
S5101 : Input selector switches in LINE A.
S5104 : Operation swithces (S-Video/Size).

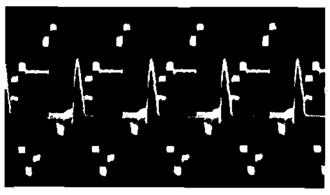

① TPKR
(L-P.W. Board)
120Vp-p/5ms. div.

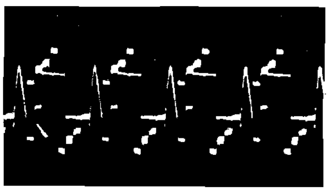

② TPKG
(L-P.W. Board)
120Vp-p/5ms. div.

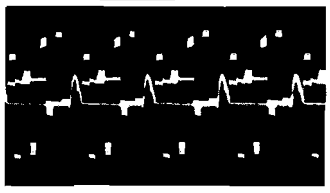

③ TPKB
(L-P.W. Board)
135Vp-p/5ms. div.

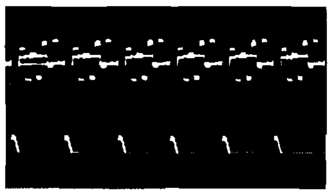

④ S4301
(W-P.W. Board)
0.45Vp-p/5µs. div.

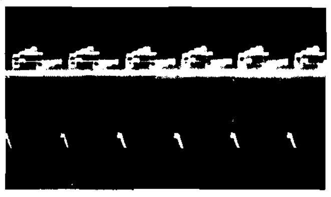

⑤ IC1602 10 Pin
(F-P.W. Board)
0.24Vp-p/50µs. div.

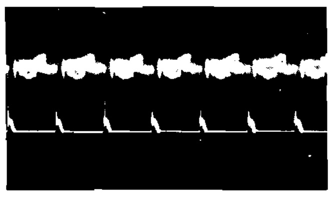

⑥ IC3301 17 Pin
(D-P.W. Board)
1.6Vp-p/50µs. div.

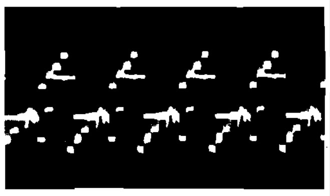

⑦ IC3301 18 Pin
(D-P.W. Board)
1.0Vp-p/50µs. div.

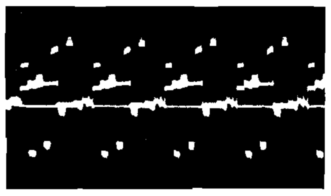

⑧ IC3301 19 Pin
(D-P.W. Board)
2.6Vp-p/50µs. div.

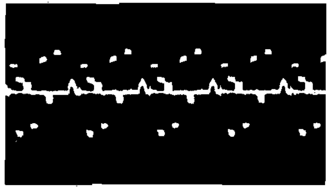

⑨ IC3301 37 Pin
(D-P.W. Board)
4.4Vp-p/50µs. div.

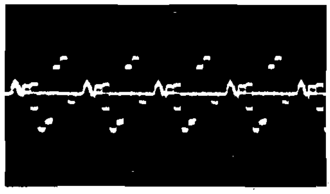

⑩ IC3301 42 Pin
(D-P.W. Board)
4.4Vp-p/50µs. div.

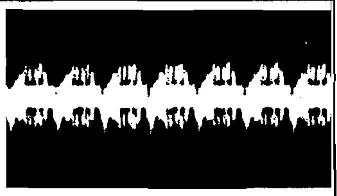

⑪ IC3301 47 Pin
(D-P.W. Board)
4.4Vp-p/50µs. div.

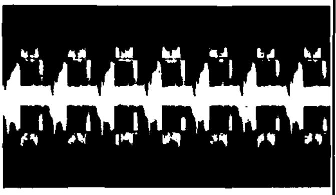

⑫ IC606 8 Pin
(A-P.W. Board)
1.0Vp-p/50µs. div.

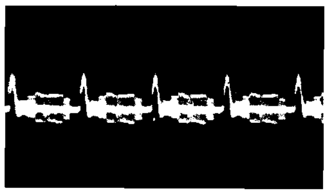

⑬ IC606 9 Pin
(A-P.W. Board)
2.8Vp-p/50µs. div.

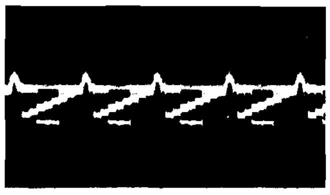

⑭ IC606 12 Pin
(A-P.W. Board)
0.6Vp-p/50µs. div.

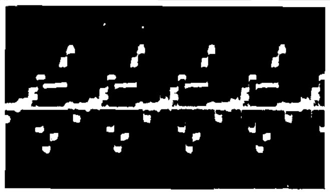

⑮ IC606 15 Pin
(A-P.W. Board)
0.7Vp-p/50µs. div.


⑯ IC602 1 Pin
(A-P.W. Board)
60mVp-p/50µs. div.


⑰ IC602 8 Pin
(A-P.W. Board)
0.1Vp-p/50µs. div.


⑱ IC603 15 Pin
(A-P.W. Board)
50mVp-p/50µs. div.


⑲ IC606 1 Pin
(A-P.W. Board)
0.25Vp-p/50µs. div.


⑳ IC606 7 Pin
(A-P.W. Board)
2.3Vp-p/50µs. div.

Note:
The power Circuit board contains a circuit area which uses separate power supply to isolate the ground connection. The circuit is defined by HOT and COLD indications in the schematic diagram. Take the following precautions.

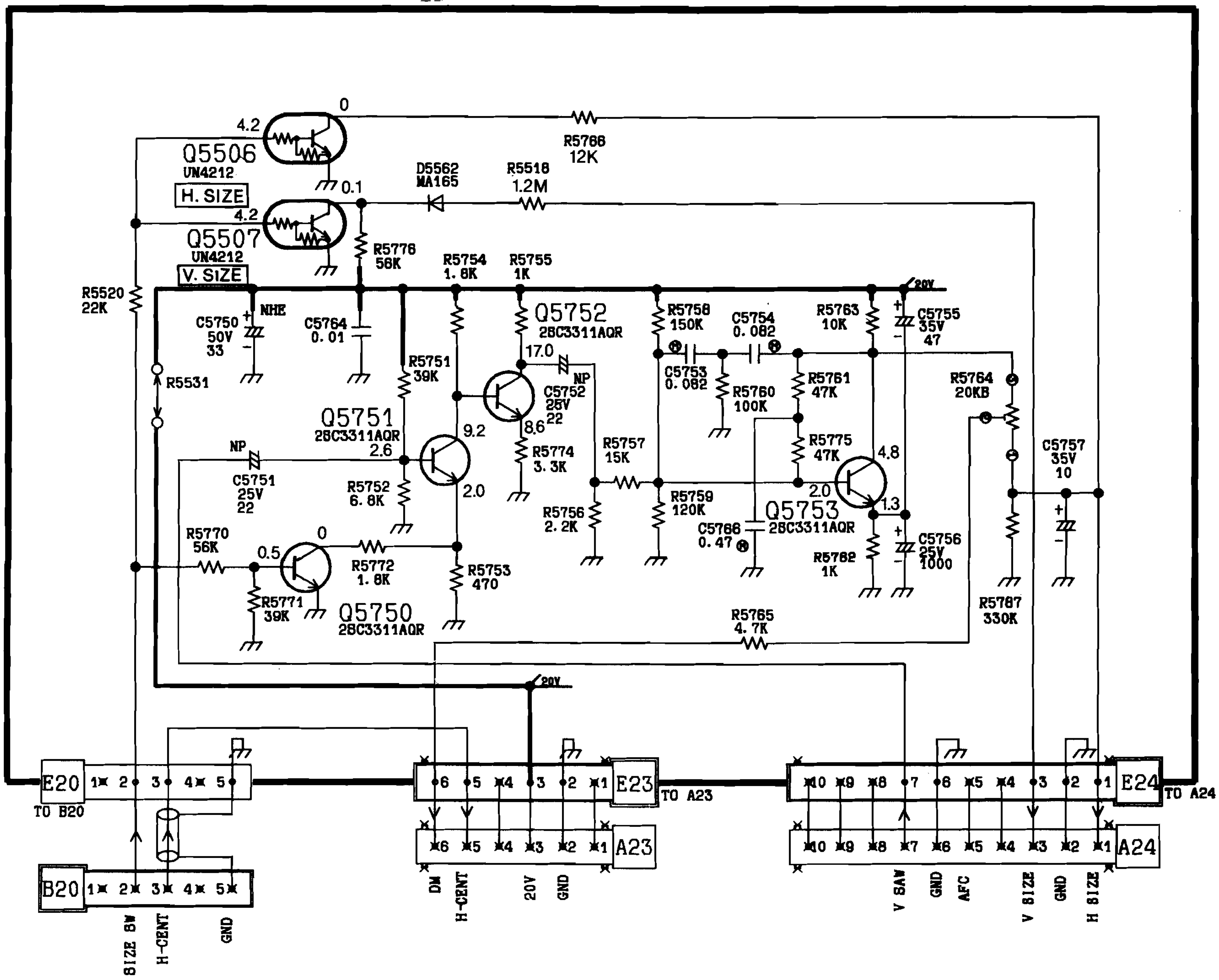
PRECAUTIONS

1. Do not touch the hot part or the hot and cold parts at the same time or you may receive a shock.
2. Do not short-circuit the hot and cold circuits or a fuse may blow and parts may break
3. Do not connect an instrument, such as an oscilloscope, to the hot and cold circuits simultaneously or a fuse may blow.
   Connect the ground of instruments to the ground connection of the circuit being measured.
4. Make sure to disconnect the power plug before removing the chassis.

oow color bar signal when all customer's are set

d subject to change without notice.

E-P.W. BOARD ENP110314DZ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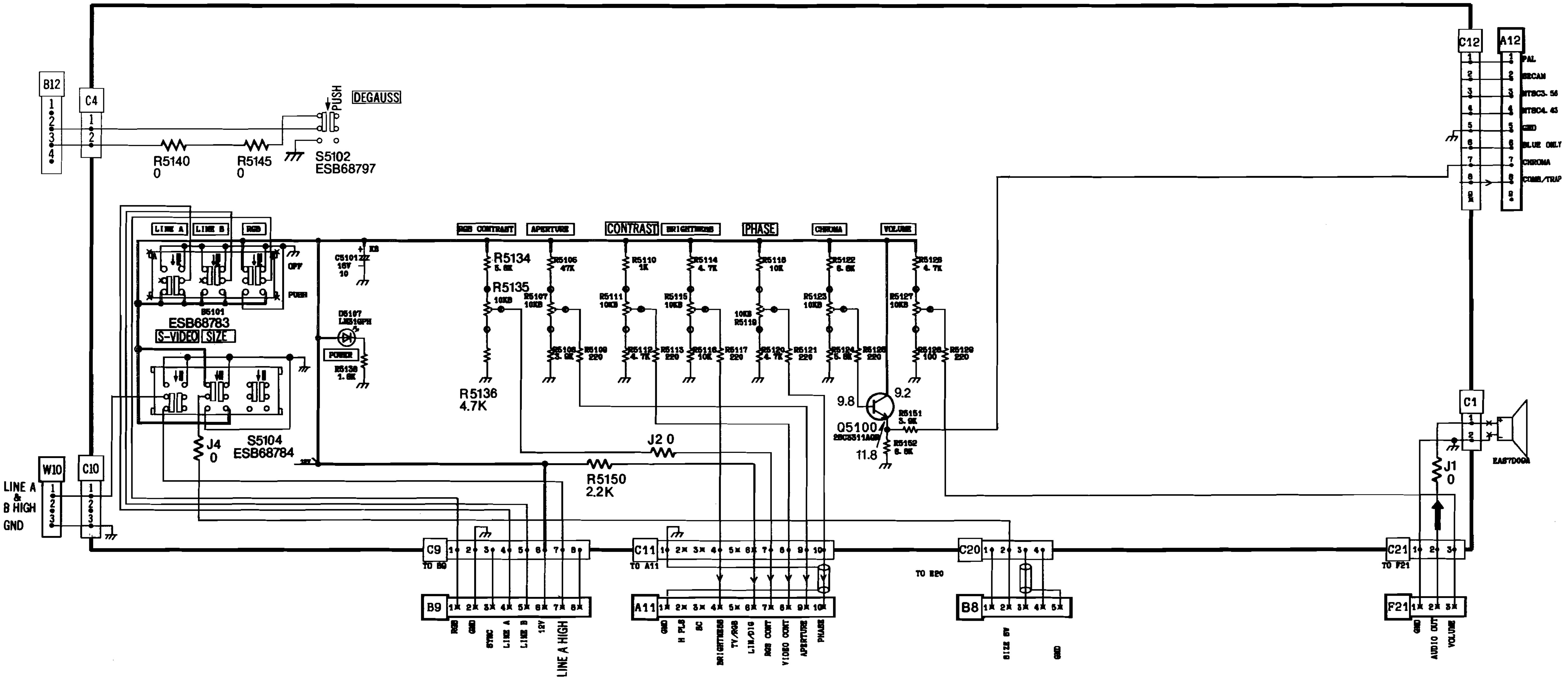
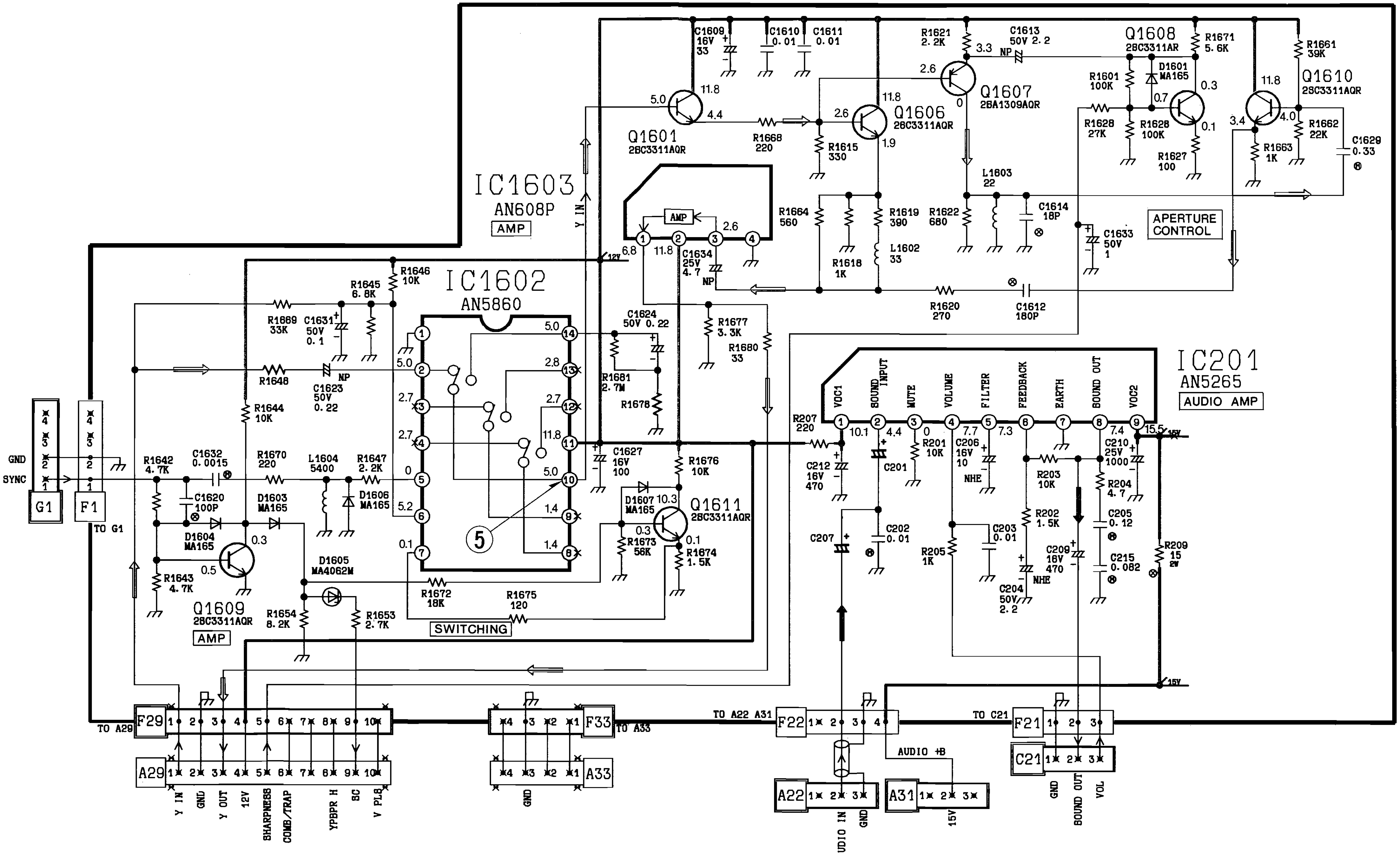
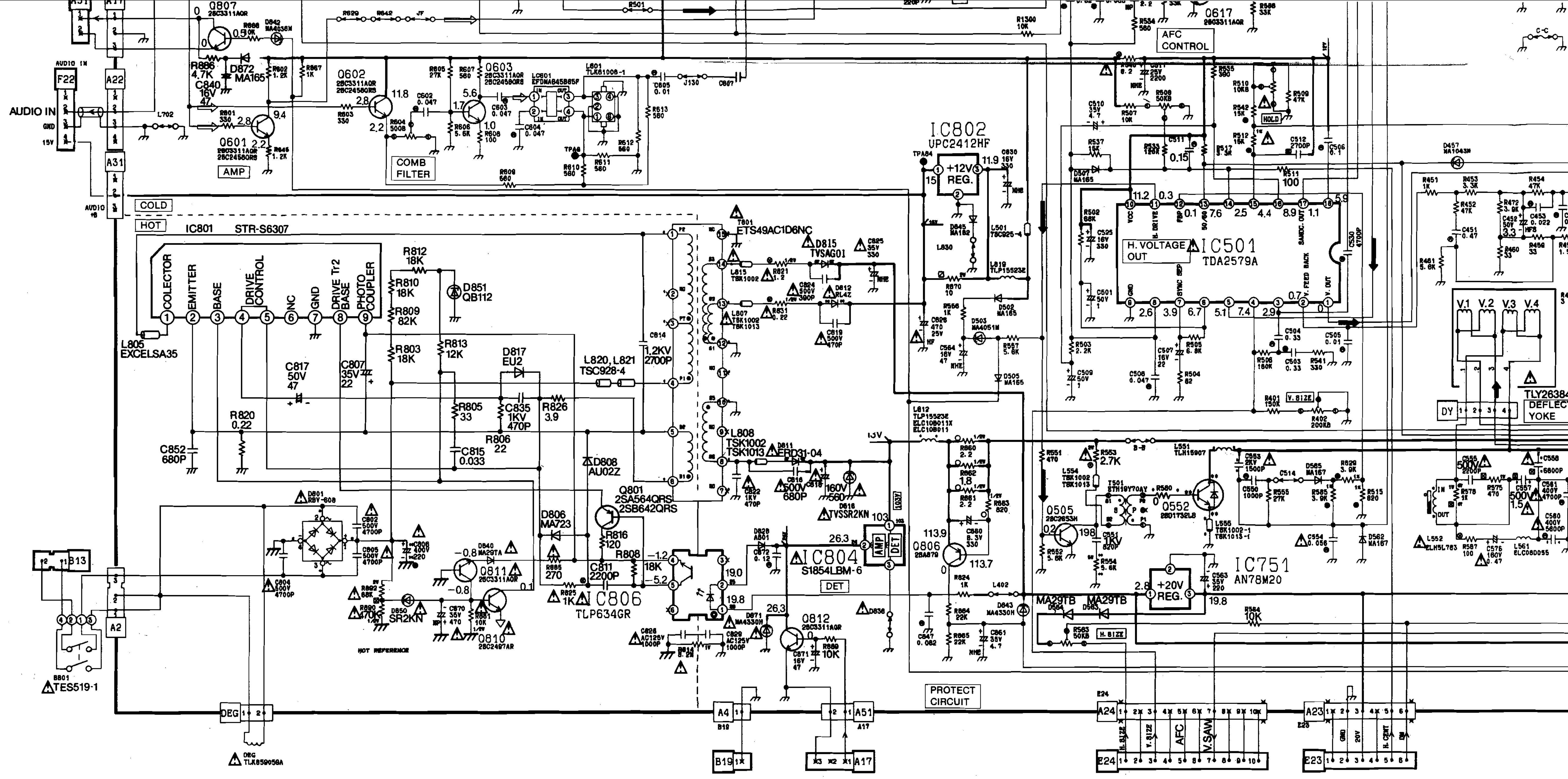
UN4212
H. SIZE
Q5507
UN4212
V. SIZE
R5766 12K
D5562 MA165
R5518 1.2M
R5776 56K
R5754 1.8K
R5755 1K
R5520 22K
C5750 50V 33
NHE
C5764 0.01
R5531
R5751 39K
Q5752 2SC3311AQR
C5752 25V 22
NP
Q5751 2SC3311AQR
C5751 25V 22
R5752 6.8K
R5774 3.3K
R5757 15K
R5756 2.2K
R5770 56K
R5771 39K
Q5750 2SC3311AQR
R5772 1.8K
R5753 470
R5758 150K
C5754 0.082
C5753 0.082
R5760 100K
R5763 10K
R5761 47K
R5775 47K
R5759 120K
C5766 0.47
Q5753 2SC3311AQR
R5762 1K
C5755 35V 47
C5756 25V 1000
R5764 20KB
C5757 35V 10
R5767 330K
R5765 4.7K
20V
E20
TO B20
B20
SIZE SW
H-CENT
GND
E23
TO A23
A23
DW
H-CENT
20V
GND
E24
TO A24
A24
V SAW
GND
AFC
V SIZE
GND
H SIZE

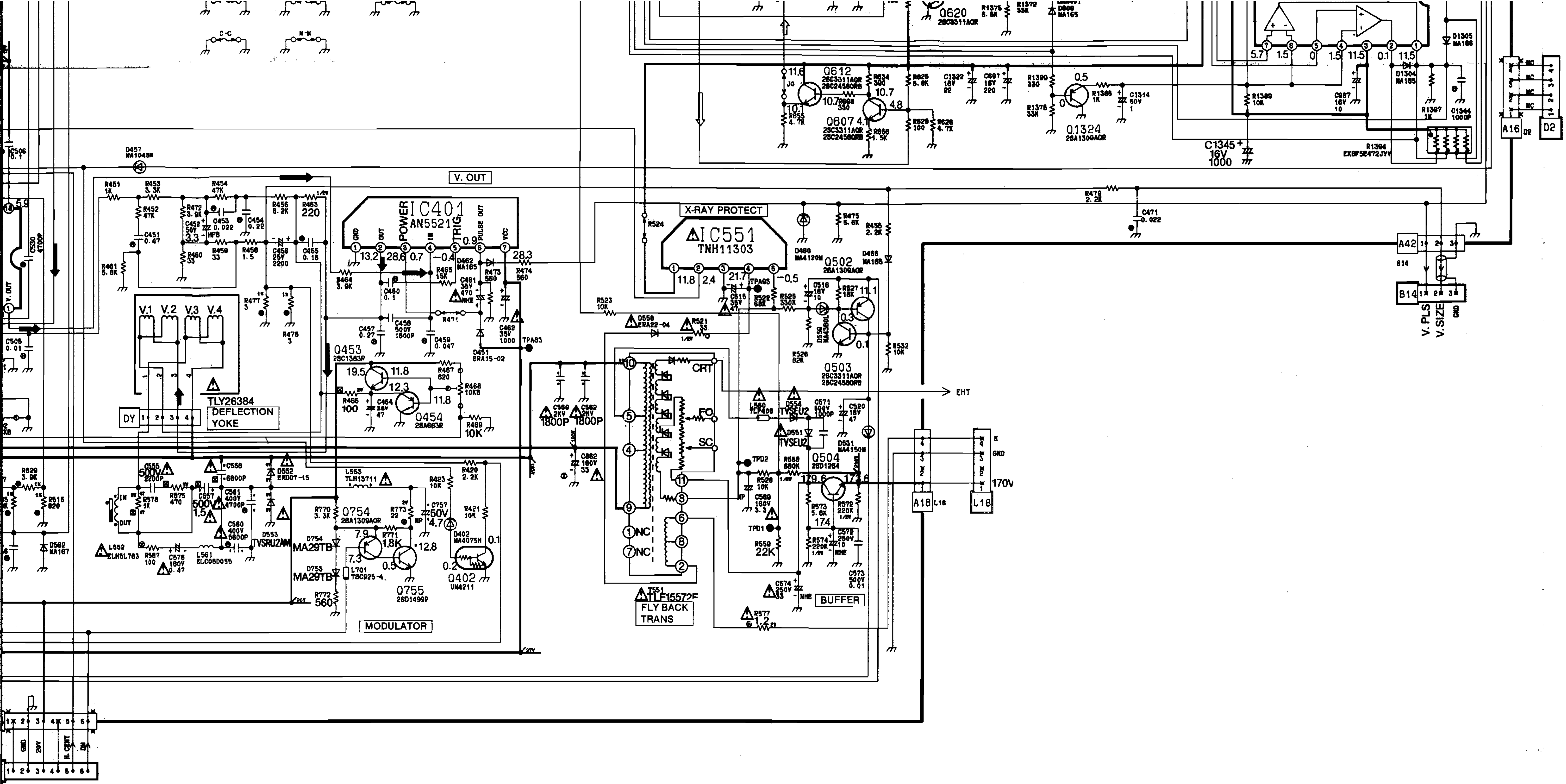
C-P.W. BOARD TNP111208CZ


B12
1
2
3
4
C4
1
2
PUSH
DEGAUSS
R5140
0
R5145
0
S5102
ESB68797
LINE A
LINE B
RGB
OFF
PUSH
S5101
ESB68783
S-VIDEO
SIZE
S5104
ESB68784
J4
0
C5101
16V
10
D5107
LN51GPH
POWER
R5130
1.8K
RGB CONTRAST
APERTURE
CONTRAST
BRIGHTNESS
PHASE
CHROMA
VOLUME
R5134
5.6K
R5135
10KB
R5136
4.7K
R5106
47K
R5107
10KB
R5108
3.9K
R5109
220
R5110
1K
R5111
10KB
R5112
4.7K
R5113
220
R5114
4.7K
R5115
10KB
R5116
10K
R5117
220
R5118
10K
R5119
10KB
R5120
4.7K
R5121
220
R5122
6.8K
R5123
10KB
R5124
5.6K
R5125
220
R5126
4.7K
R5127
10KB
R5128
100
R5129
220
9.8
9.2
Q5100
2SC5311AGR
11.8
R5151
3.9K
R5152
6.8K
J2 0
R5150
2.2K
C12
A12
PAL
SECAM
NTSC3.58
NTSC4.43
GND
BLUE ONLY
CHROMA
COMB/TRAP
C1
EAS7D09A
J1
0
LINE A & B HIGH
GND
W10
C10
1
2
3
C9
TO B9
B9
RGB
GND
SYNC
LINE A
LINE B
12V
LINE A HIGH
C11
TO A11
A11
GND
H PLS
SC
BRIGHTNESS
TV/RGB
LIN/DIG
RGB CONT
VIDEO CONT
APERTURE
PHASE
C20
TO B20
B8
SIZE 5V
GND
C21
TO F21
F21
GND
AUDIO OUT
VOLUME

F-P.W. BOARD TNP110144CZ


IC1603
AN608P
AMP
Y IN
IC1602
AN5860
SWITCHING
IC201
AN5265
AUDIO AMP
VCC1
SOUND INPUT
MUTE
VOLUME
FILTER
FEEDBACK
EARTH
SOUND OUT
VCC2
APERTURE CONTROL
Q1601
2SC3311AQR
Q1606
2SC3311AQR
Q1607
2SA1309AQR
Q1608
2SC3311AR
Q1610
2SC3311AQR
Q1609
2SC3311AQR
AMP
Q1611
2SC3311AQR
C1609 16V 33
C1610 0.01
C1611 0.01
R1621 2.2K
C1613 50V 2.2 NP
R1671 5.6K
R1661 39K
R1601 100K
D1601 MA165
R1628 27K
R1626 100K
R1627 100
R1662 22K
R1663 1K
C1629 0.33
R1668 220
R1615 330
L1603 22
R1664 560
R1619 390
R1622 680
C1614 18P
C1633 50V 1
R1618 1K
L1602 33
R1620 270
C1612 180P
C1634 25V 4.7 NP
R1646 10K
R1645 6.8K
R1669 33K
C1631 50V 0.1
R1648
C1623 50V 0.22 NP
R1644 10K
C1624 50V 0.22
R1681 2.7M
R1678
R1677 3.3K
R1680 33
C1627 16V 100
R1676 10K
D1607 MA165
R1673 56K
R1674 1.5K
R1642 4.7K
C1632 0.0015
R1670 220
L1604 5400
R1647 2.2K
D1606 MA165
C1620 100P
D1603 MA165
D1604 MA165
R1643 4.7K
D1605 MA4062M
R1672 18K
R1675 120
R1654 8.2K
R1653 2.7K
R207 220
C212 16V 470
C201
R201 10K
C206 16V 10 NHE
R203 10K
R204 4.7
C210 25V 1000
C202 0.01
C207
C203 0.01
R205 1K
R202 1.5K
C209 16V 470
C205 0.12
C215 0.082
R209 15 2W
C204 50V 2.2 NHE
GND
SYNC
G1
F1
TO G1
F29
TO A29
A29
Y IN
GND
Y OUT
12V
SHARPNESS
COMB/TRAP
YPBPR H
BC
V PLS
F33
TO A33
A33
GND
TO A22 A31
F22
A22
AUDIO IN
GND
A31
15V
AUDIO +B
TO C21
F21
C21
GND
SOUND OUT
VOL
15V
12V
5


AUDIO IN
AUDIO IN
GND
15V
F22
A22
A31
AUDIO +B
Q807 2SC3311AQR
D842 MA4036M
R886 4.7K
D872 MA165
C840 16V 47
Q601 2SC3311AQR 2SC2458ORS
AMP
Q602 2SC3311AQR 2SC2458ORS
COMB FILTER
Q603 2SC3311AQR 2SC2458ORS
L601 TLK61008-1
J130
COLD
HOT
IC801 STR-S6307
COLECTOR
EMITTER
BASE
DRIVE CONTROL
NC
GND
DRIVE Tr2 BASE
PHOTO COUPLER
L805 EXCELSA35
R812 18K
R810 18K
R809 82K
D851 QB112
R803 18K
R813 12K
D817 EU2
C817 50V 47
C807 35V 22
L820, L821 TSC928-4
C814 1.2KV 2700P
R805 33
C835 1KV 470P
R826 3.9
R806 22
R820 0.22
C852 680P
C815 0.033
D808 AU02Z
T801 ETS49AC1D6NC
D815 TVSAG01
C825 35V 330
L815 TSK1002
R821 1.2
L807 TSK1002 TSK1013
R831 0.22
D812 RL4Z
C819 500V 470P
L808 TSK1002 TSK1013
D811 ERD31-04
C816 500V 680P
160V 560
D816 TVSSR2KN
D801 RBY-608
C802 500V 4700P
C805 500V 4700P
C804 500V 4700P
Q801 2SA564QRS 2SB642QRS
D806 MA723
R816 120
C811 2200P
R808 18K
IC806 TLP634GR
R885 270
R825 1K
Q811 2SC3311AQR
Q810 2SC2497AR
D840 MA29TA
D850 SR2KN
R890 470K
HOT REFERENCE
IC804 S1854LBM-6
AMP
DET
DET
Q812 2SC3311AQR
R889 10K
C871 16V 47
D871 MA4330H
C828 AC125V 1000P
C829 AC125V 1000P
B13
S801 TES519-1
A2
DEG
DEG TLK859059A
A4
B19
A51
A17
PROTECT CIRCUIT
IC802 UPC2412HF
+12V REG.
TPA84
L501 TSC925-4
L830
L819 TLP15523E
D503 MA4051M
D502 MA165
D505 MA165
L812 TLP15523E ELC10B011X ELC10B011
Q806 2SA879
R824 1K
L402
D843 MA4330H
13V
103V
AFC CONTROL
Q617 2SC3311AQR
R1300 10K
IC501 TDA2579A
H. VOLTAGE OUT
HOLD
V.SIZE
R402 200KB
D507 MA165
D457 MA1043M
L551 TLN15907
L554 TSK1002 TSK1013
T501 STH10Y70AY
Q552 2SD1732LS
Q505 2SC2653H
L555 TSK1002-1 TSK1013-1
D565 MA167
D562 MA167
IC751 AN78M20
+20V REG.
MA29TB D564
MA29TB D563
R563 50KB
H.SIZE
R584 10K
DY
TLY26384
DEFLECTION YOKE
V.1 V.2 V.3 V.4
L552 ELH5L763
L561 ELC08D055
A24
E24
H.SIZE
V.SIZE
AFC
V.SAW
A23
E23
GND
20V
H.CENT


V. OUT
IC401
AN5521
POWER
TRIG
GND
OUT
PULSE OUT
VCC
X-RAY PROTECT
IC551
TNH11303
V.1 V.2 V.3 V.4
TLY26384
DY
DEFLECTION YOKE
Q453
2SC1383R
Q454
2SA683R
R466 100
R469 10K
D457 MA1043H
R451 1K
R453 3.3K
R454 47K
R452 47K
R472 3.9K
C453 0.022
C454 0.22
R456 8.2K
R463 220
C455 0.15
C456 25V 2200
R459 33
R458 1.5
R460 33
C451 0.47
R461 5.6K
R464 3.9K
R465 15K
R471
D462 MA165
R473 560
R474 560
C461 35V 470
C462 35V 1000
D451 ERA15-02
C457 0.27
C458 500V 1600P
C459 0.047
R467 820
R468 10KB
C464 16V 47
TPA83
L553 TLH13711
Q754
2SA1309AQR
Q755
2SD1499P
Q402
UN4211
D402 MA4075H
D754 MA29TB
D753 MA29TB
L701 TBC925-4
R772 560
R770 3.3K
R771 1.8K
R773 22
C757 50V 4.7
R423 10K
R420 2.2K
R421 10K
MODULATOR
L552 ZLH5L763
R587 100
C576 180V 0.47
L561 ELC08D055
C555 500V 2200P
C557 500V 1.5
C558 6800P
C561 400V 4700P
C560 400V 5600P
D552 ERD07-15
D553 TVSRU2AM
R578 1K
R575 470
R529 3.9K
R515 820
D562 MA167
C505 0.01
C506 0.1
C530 4700P
T551
TLF15572F
FLY BACK TRANS
CRT
FO
SC
NC
EHT
C569 2KV 1800P
C562 2KV 1800P
C682 160V 33
R523 10K
D558 ERA22-04
R521 33
C515 35V 47
TPAGS
R522 68K
R525 330K
D460 MA4120M
R475 5.6K
R455 2.2K
D455 MA165
Q502
2SA1309AQR
Q503
2SC3311AQR
2SC2458ORB
C516 16V 10
R527 18K
R526 82K
R532 10K
L560 TLP408
D554 TVSEU2
D551 TVSEU2
C571 500V 1000P
C520 16V 47
D531 MA4150M
TPD2
TPD1
R558 680K
R528 10K
C569 160V 3.3
R559 22K
Q504
2SD1264
R573 5.6K
R572 220K
R574 220K
C572 250V 10
C573 500V 0.01
C574 250V 33
R577 1.2
BUFFER
170V
A18
L18
K
GND
R479 2.2K
C471 0.022
R524
A42
B14
V. PLS
V. SIZE
GND
Q612
2SC3311AQR
2SC2458ORB
Q607
2SC3311AQR
2SC2458ORB
Q620
2SC3311AQR
Q1324
2SA1309AQR
R655 4.7K
R658 330
R634 390
R656 1.5K
R625 6.8K
R629 100
R626 4.7K
C1322 16V 22
C597 16V 220
R1399 330
R1378 33K
R1386 1K
C1314 50V 1
R1375 6.8K
R1372 33K
D609 MA165
R1389 10K
C687 16V 10
D1304 MA165
D1305 MA165
R1397 1K
C1344 1000P
C1345 16V 1000
R1394 EXBF5E472JYV
A16
D2
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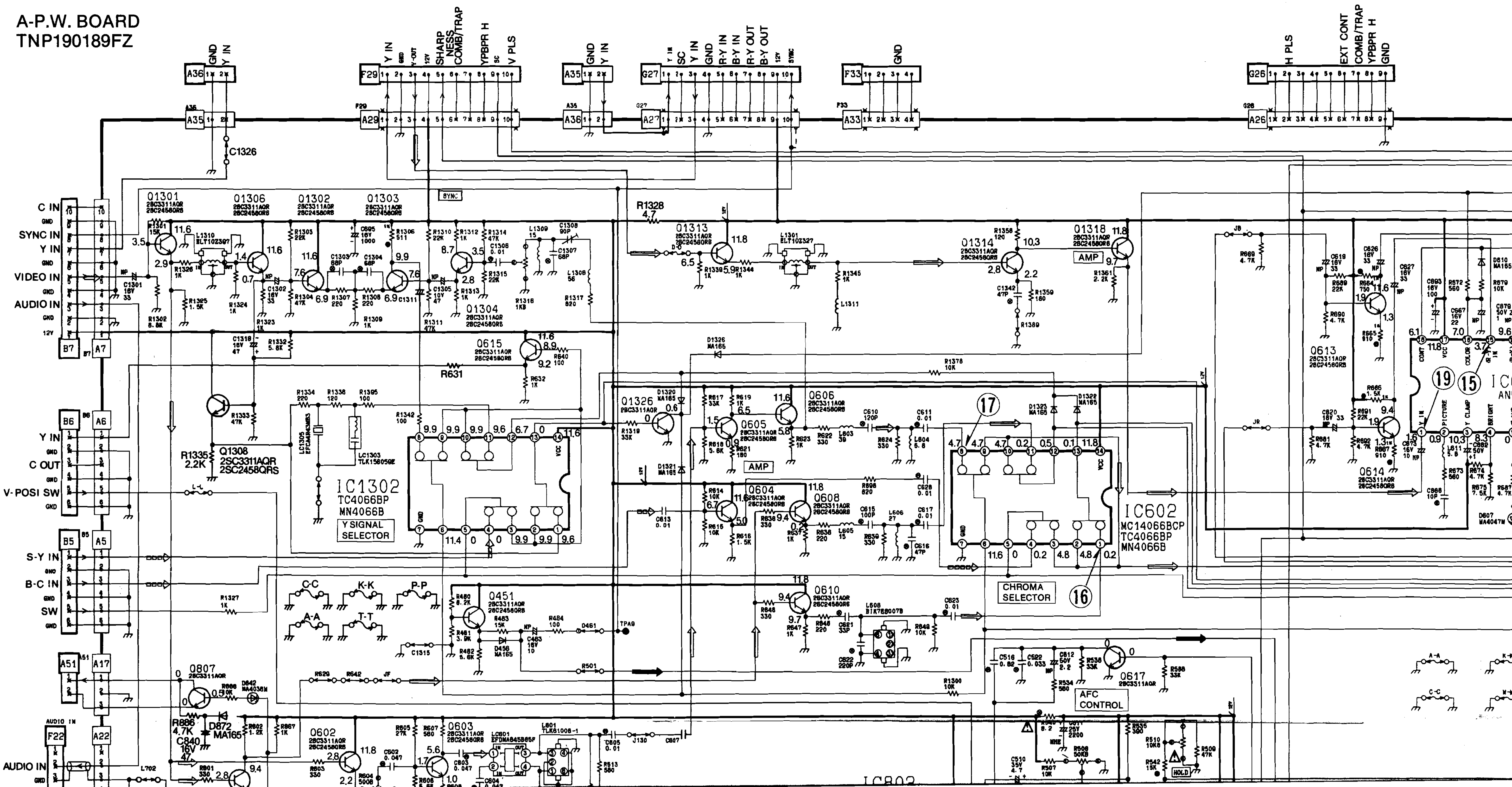
20V
H. CENT
GND
C-C
N-N

A-P.W. BOARD
TNP190189FZ



A36
GND
Y IN
F29
Y IN
GND
Y-OUT
12V
SHARP NESS
COMB/TRAP
YPBPR H
SC
V PLS
A35
GND
Y IN
G27
Y IN
SC
Y IN
GND
R-Y IN
B-Y IN
R-Y OUT
B-Y OUT
12V
SYNC
F33
GND
G26
H PLS
EXT CONT
COMB/TRAP
YPBPR H
GND
A35
A29
A36
A27
A33
A26
C1326
C IN
GND
SYNC IN
Y IN
GND
VIDEO IN
GND
AUDIO IN
GND
12V
B7
A7
Q1301
2SC3311AQR
2SC2458QRS
Q1306
Q1302
Q1303
SYNC
R1328
4.7
Q1313
L1301
ELT10Z327
Q1314
Q1318
AMP
L1310
ELT10Z307
Q1304
Q615
R631
R1378
D1326
MA165
Y IN
GND
C OUT
V-POSI SW
GND
B6
A6
R1335
2.2K
Q1308
2SC3311AQR
2SC2458QRS
IC1302
TC4066BP
MN4066B
Y SIGNAL SELECTOR
LC1303
TLK156059E
Q1326
Q0605
Q606
AMP
Q604
Q608
(17)
(16)
IC602
MC14066BCP
TC4066BP
MN4066B
CHROMA SELECTOR
Q613
Q614
(19)
(15)
IC
S-Y IN
GND
B-C IN
GND
SW
GND
B5
A5
C-C
K-K
P-P
A-A
T-T
Q451
TPA9
R1327
1K
Q610
L608
BIK788007B
Q617
AFC CONTROL
C1315
R629
R642
JF
R501
A51
A17
Q807
2SC3311AQR
D642
MA4036M
R886
4.7K
D872
MA165
C840
16V
47
AUDIO IN
F22
A22
AUDIO IN
GND
L702
Q602
Q603
LC601
EFDMA845B65P
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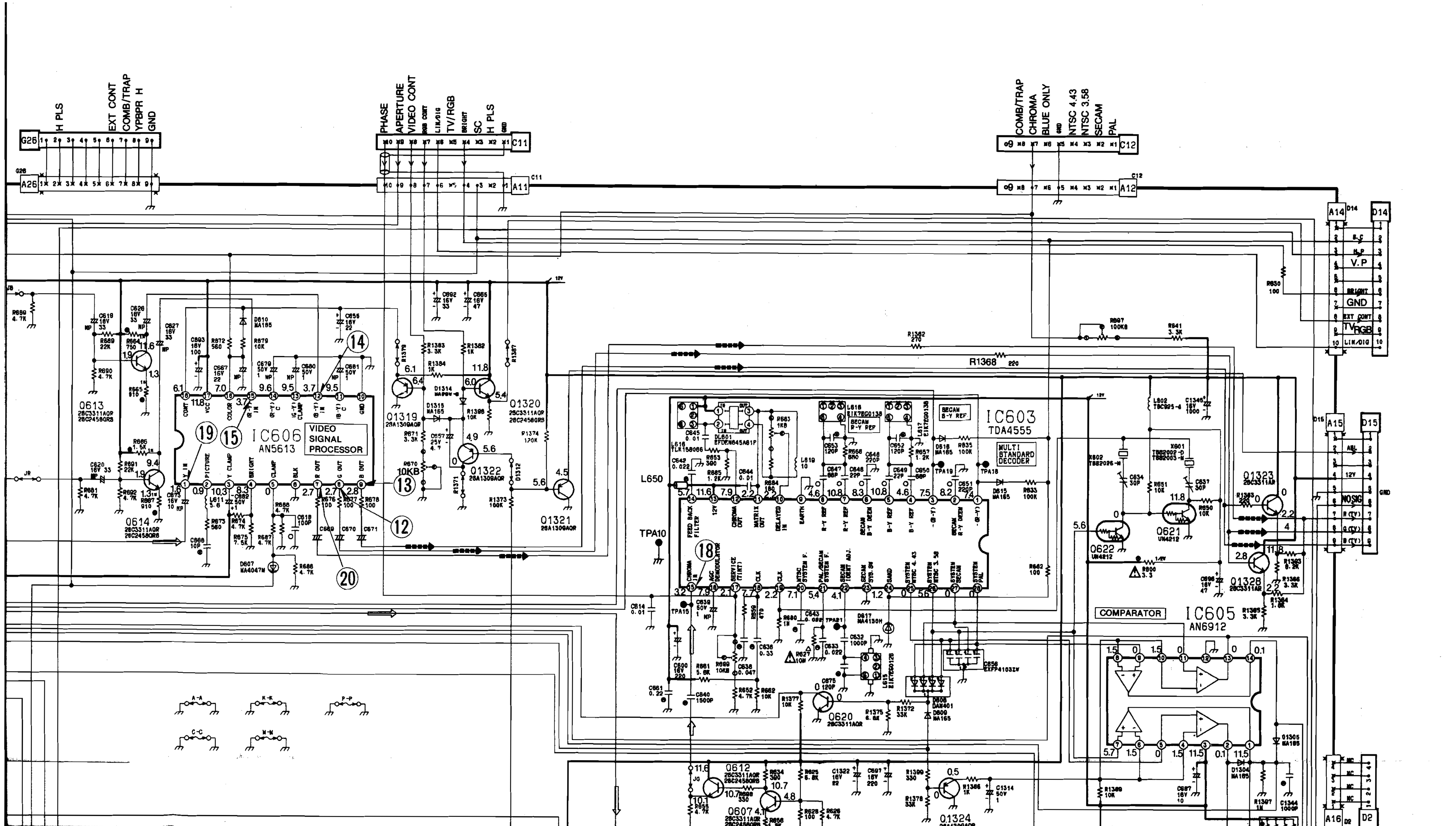
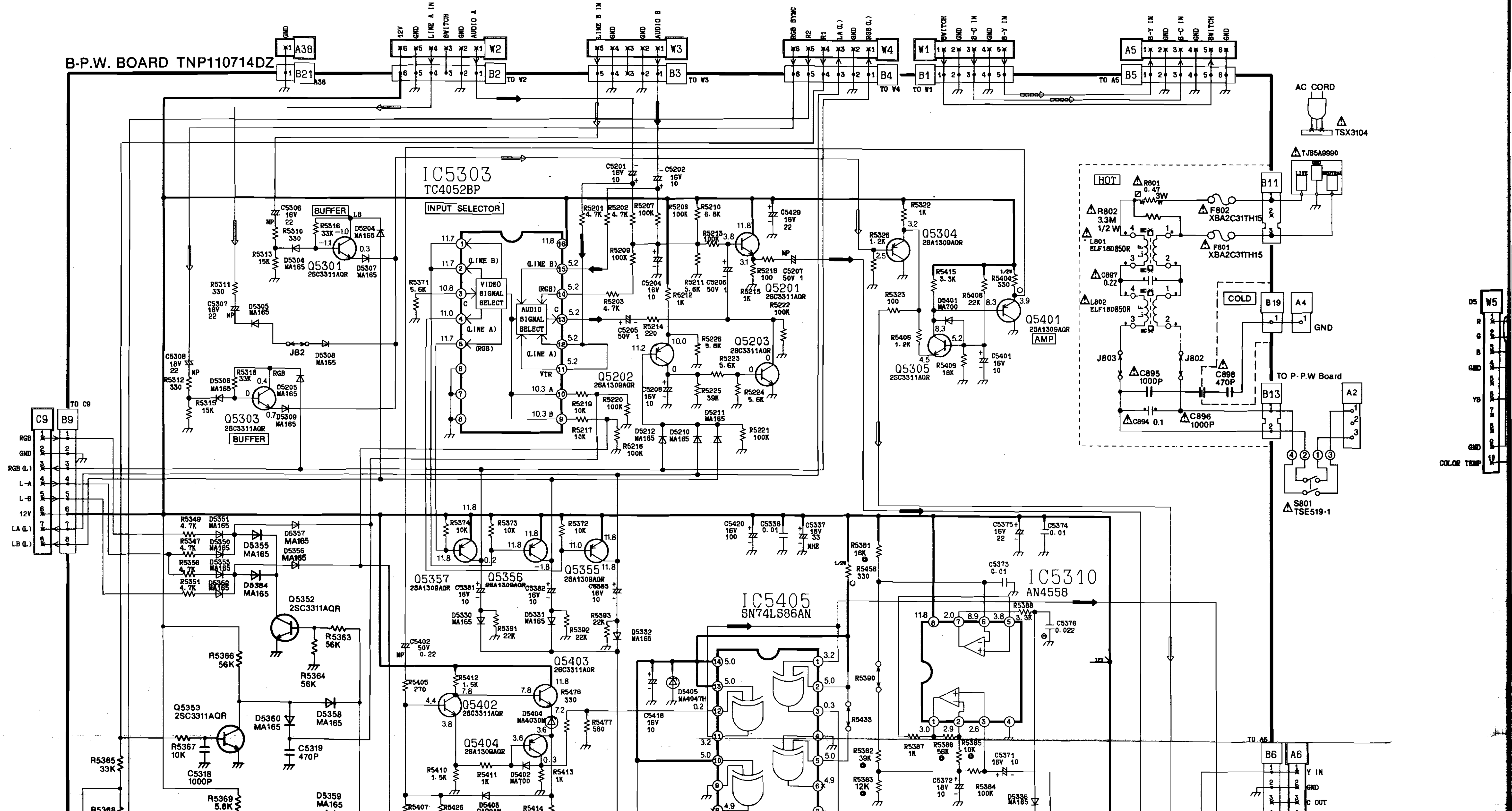
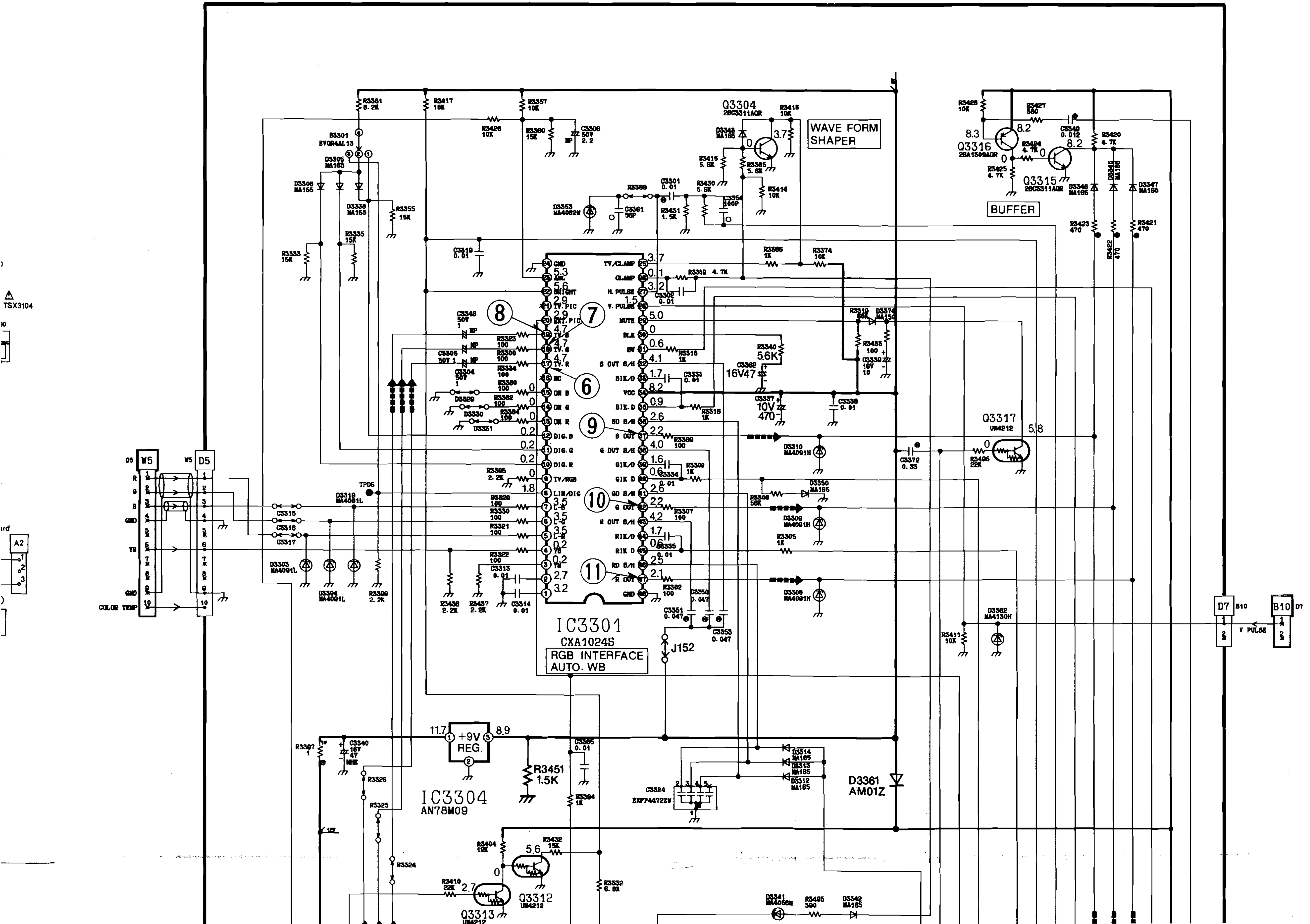
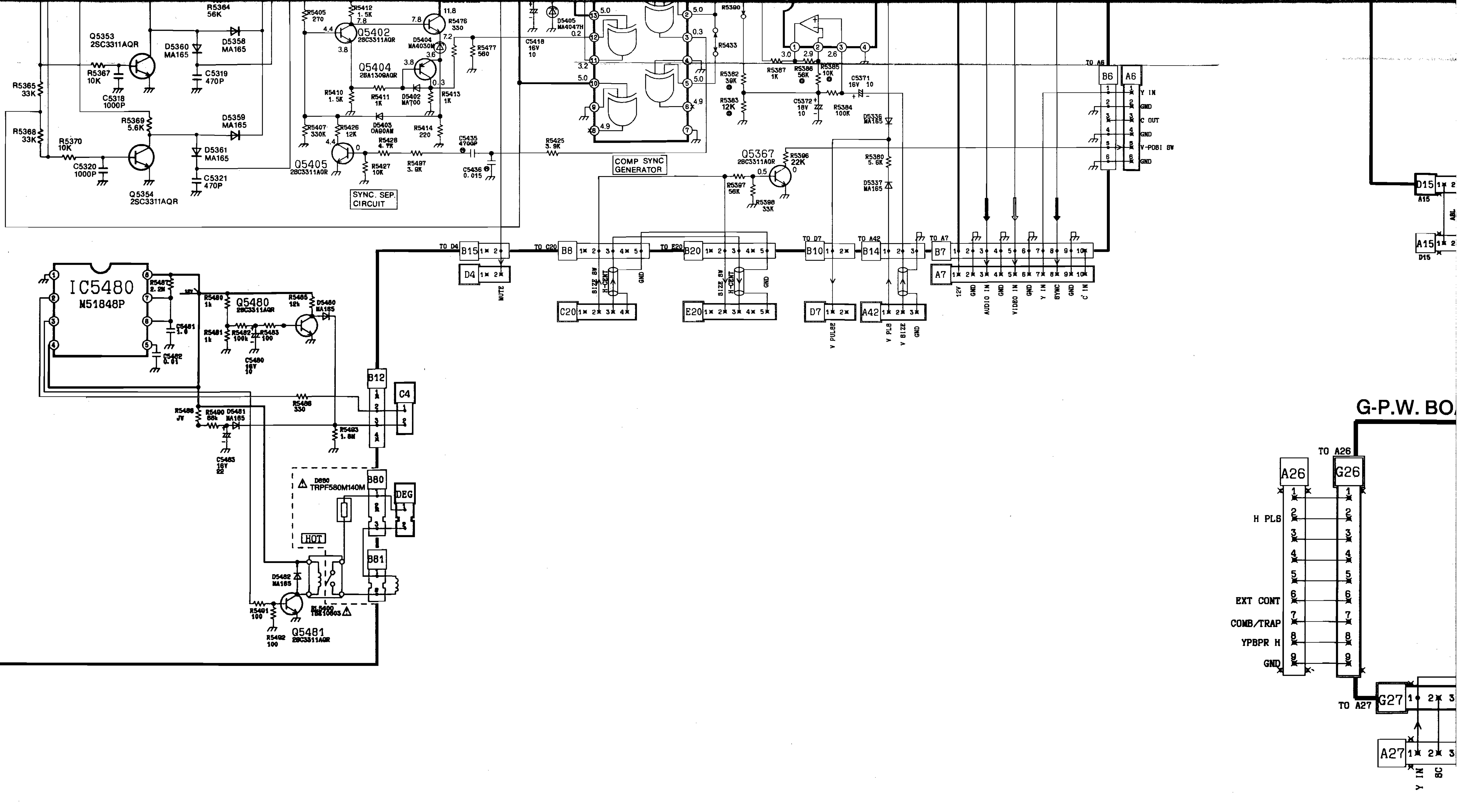
TLK81006-1
C805
0.01
J130
C807
IC802
HOLD
A-A
C-C

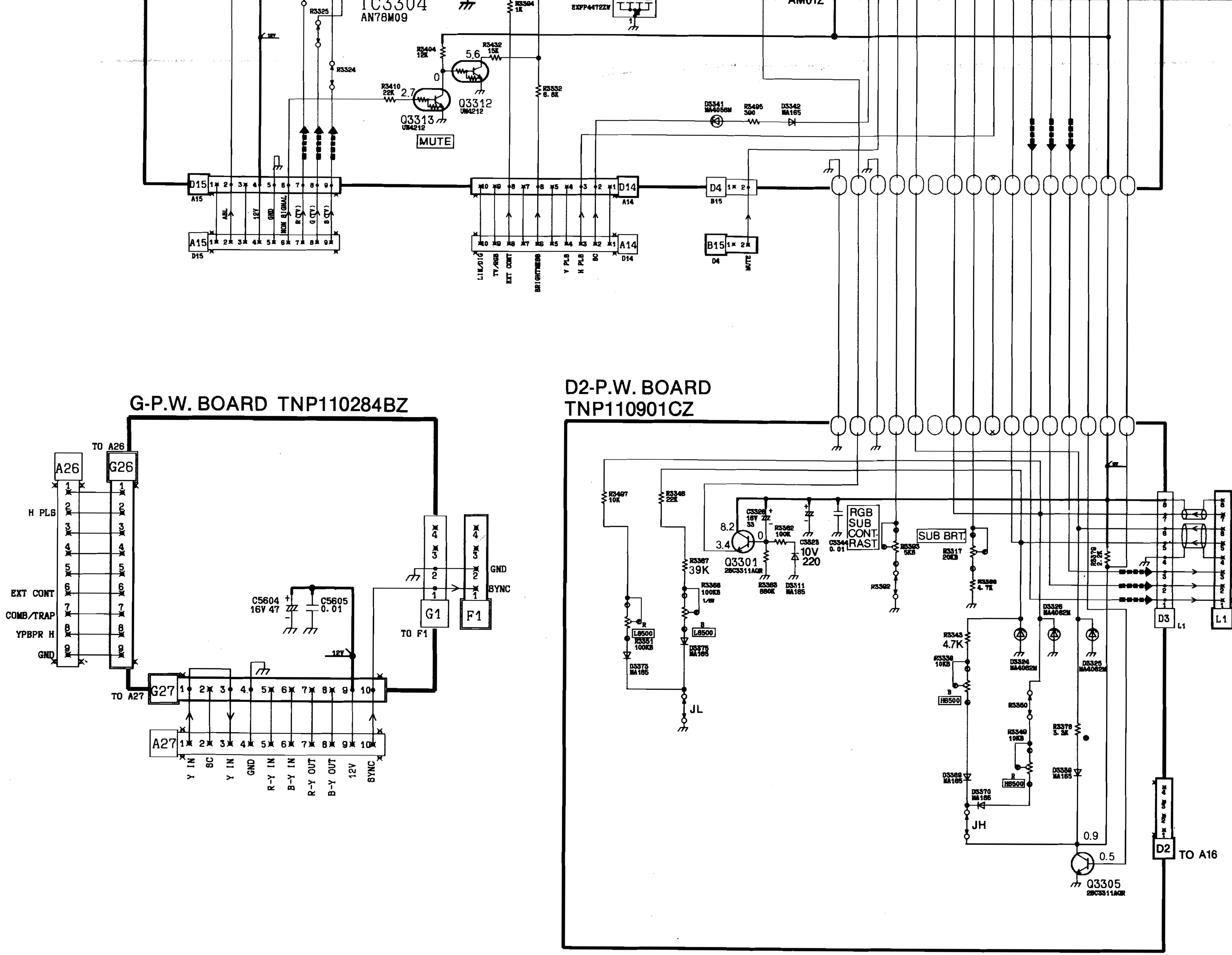

H PLS
EXT CONT
COMB/TRAP
YPBPR H
GND
G26
A26
PHASE
APERTURE
VIDEO CONT
RGB CONT
LIN/DIG
TV/RGB
BRIGHT
SC
H PLS
GND
C11
A11
COMB/TRAP
CHROMA
BLUE ONLY
GND
NTSC 4.43
NTSC 3.58
SECAM
PAL
C12
A12
A14
D14
A15
D15
A16
D2
V.P
GND
BRIGHT
EXT CONT
TV/RGB
LIN/DIG
IC606
AN5613
VIDEO SIGNAL PROCESSOR
IC603
TDA4555
MULTI STANDARD DECODER
IC605
AN6912
COMPARATOR
Q613
Q614
Q1319
Q1320
Q1321
Q1322
Q1323
Q1328
Q620
Q621
Q622
Q612
Q607
Q1324
L650
TPA10
TPA15
R1368
R1362
12
13
14
15
18
19
20


B-P.W. BOARD TNP110714DZ
IC5303
TC4052BP
INPUT SELECTOR
VIDEO SIGNAL SELECT
AUDIO SIGNAL SELECT
(LINE A)
(LINE B)
(RGB)
VTR
IC5405
SN74LS86AN
IC5310
AN4558
Q5201 2SC3311AQR
Q5202 2SA1309AQR
Q5203 2SC3311AQR
Q5301 2SC3311AQR
Q5303 2SC3311AQR
BUFFER
Q5304 2SA1309AQR
Q5305 2SC3311AQR
Q5401 2SA1309AQR
AMP
Q5352 2SC3311AQR
Q5353 2SC3311AQR
Q5355 2SA1309AQR
Q5356 2SA1309AQR
Q5357 2SA1309AQR
Q5402 2SC3311AQR
Q5403 2SC3311AQR
Q5404 2SA1309AQR
AC CORD
TSX3104
TJB5A9990
HOT
COLD
R801 0.47 3W
R802 3.3M 1/2W
F801 XBA2C31TH15
F802 XBA2C31TH15
L801 ELF18D850R
L802 ELF18D850R
C894 0.1
C895 1000P
C896 1000P
C897 0.22
C898 470P
J802
J803
JB2
S801 TSE519-1
TO P-P.W Board
GND
A2
A4
A5
A6
A38
B1
B2
B3
B4
B5
B6
B9
B11
B13
B19
B21
C9
W1
W2
W3
W4
W5
TO W1
TO W2
TO W3
TO W4
TO A5
TO A6
TO C9
12V
LINE A IN
SWITCH
AUDIO A
LINE B IN
AUDIO B
RGB SYNC
R2
R1
LA (L)
RGB (L)
B-C IN
B-Y IN
RGB
L-A
L-B
LB (L)
Y IN
C OUT
COLOR TEMP

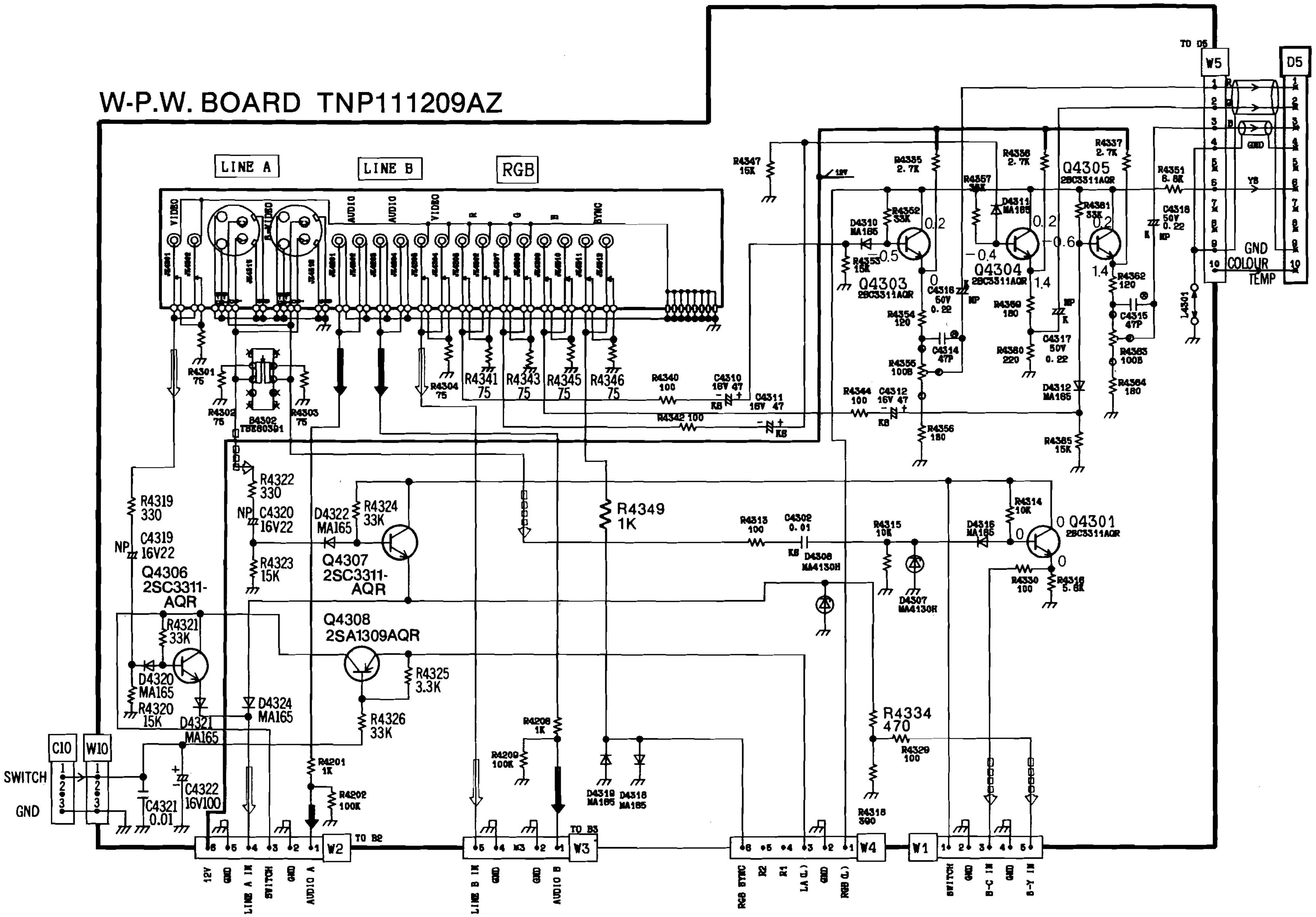
D1-P.W. BOARD TNP110900CZ


IC3301
CXA1024S
RGB INTERFACE
AUTO. WB
IC3304
AN78M09
+9V REG.
WAVE FORM SHAPER
BUFFER
Q3304
2SC3311AQR
Q3316
2SA1309AQR
Q3315
2SC3311AQR
Q3317
UN4212
Q3312
UN4212
Q3313
UN4212
D3361
AM01Z
R3451
1.5K
J152
C3324
EXFP4472ZW
W5
D5
D7
B10
A2
V PULSE
R
G
B
GND
YS
COLOR TEMP
TPD6
GND
ABL
BRIGHT
TV.PIC
EXT.PIC
TV.B
TV.G
TV.R
NC
ON B
ON G
ON R
DIG.B
DIG.G
DIG.R
TV/RGB
LIN/DIG
L-B
L-G
L-R
YS
TV/CLAMP
CLAMP
H. PULSE
V. PULSE
MUTE
BLK
SW
B OUT S/H
BIK/D
VCC
BIK D
BD S/H
B OUT
G OUT S/H
GIK/D
GIK D
GD S/H
G OUT
R OUT S/H
RIK/D
RIK D
RD S/H
R OUT
⑥
⑦
⑧
⑨
⑩
⑪
11.7
8.9
5.6
2.7
0
8.3
8.2
3.7
5.8
TSX3104

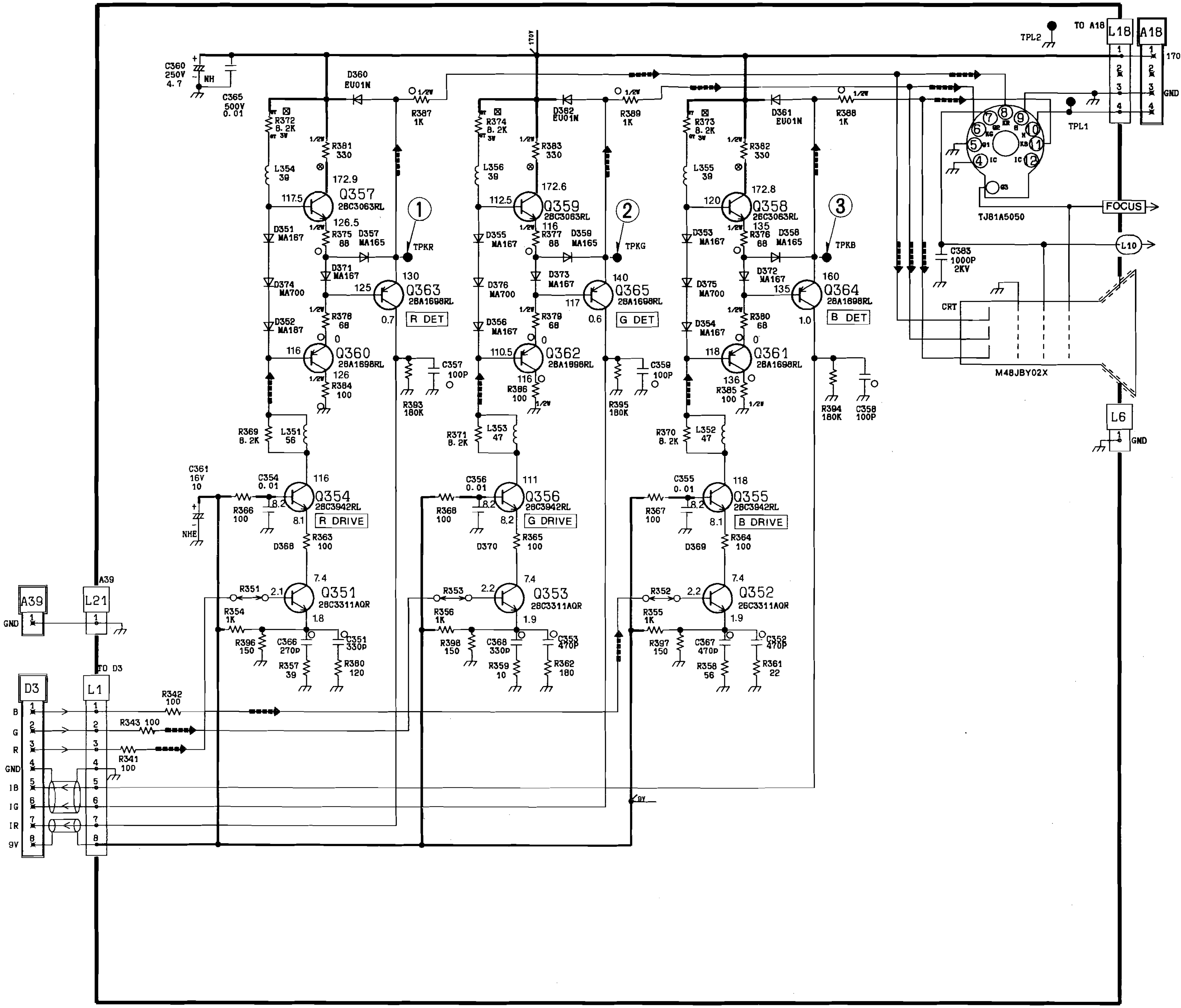

Q5353
2SC3311AQR
Q5354
2SC3311AQR
R5364
56K
D5360
MA165
D5358
MA165
C5319
470P
R5365
33K
R5367
10K
C5318
1000P
R5369
5.6K
D5359
MA165
R5368
33K
R5370
10K
D5361
MA165
C5320
1000P
C5321
470P
Q5402
2SC3311AQR
Q5404
2SA1309AQR
Q5405
2SC3311AQR
R5405
270
R5412
1.5K
R5476
330
R5477
560
D5404
MA4030M
R5410
1.5K
R5411
1K
D5402
MA700
R5413
1K
R5407
330K
R5426
12K
D5403
OA90AM
R5428
4.7K
R5414
220
R5427
10K
R5497
3.9K
C5435
4700P
C5436
0.015
R5425
3.9K
SYNC. SEP.
CIRCUIT
D5405
MA4047H
C5418
16V
10
COMP SYNC
GENERATOR
R5390
R5433
R5382
39K
R5383
12K
R5387
1K
R5386
56K
R5385
10K
C5371
16V 10
C5372
16V
10
R5384
100K
D5336
MA165
Q5367
2SC3311AQR
R5396
22K
R5397
56K
R5398
33K
R5380
5.6K
D5337
MA165
TO A6
B6
A6
Y IN
GND
C OUT
GND
V-POSI SW
GND
TO D4
B15
D4
MUTE
TO C20
B8
C20
SIZE SW
H-CENT
GND
TO E20
B20
E20
SIZE SW
H-CENT
GND
TO D7
B10
D7
V PULSE
TO A42
B14
A42
V PLS
V SIZE
GND
TO A7
B7
A7
12V
GND
AUDIO IN
GND
VIDEO IN
GND
Y IN
SYNC
GND
C IN
D15
A15
A15
D15
ABL
IC5480
M51848P
R5487
2.2M
R5480
1k
Q5480
2SC3311AQR
R5485
12k
D5480
MA165
R5481
1k
R5482
100k
R5483
100
C5481
1.0
C5482
0.01
C5480
16V
10
B12
C4
R5488
330
R5486
JV
R5490
68k
D5481
MA165
R5493
1.8M
C5483
16V
22
D680
TRPF580M140M
B80
DEG
HOT
B81
D5482
MA165
R5491
100
R5492
100
Q5481
2SC3311AQR
RL5400
TSE10603
G-P.W. BO
TO A26
A26
G26
H PLS
EXT CONT
COMB/TRAP
YPBPR H
GND
TO A27
G27
A27
Y IN
SC


G-P.W. BOARD TNP110284BZ
D2-P.W. BOARD TNP110901CZ
IC3304
AN78M09
Q3312
UN4212
Q3313
UN4212
MUTE
R3325
R3324
R3404 12K
R3432 15K
R3410 22K
R3332 6.8K
R3304 1K
EXFP4472ZV
D3341 MA4056M
R3495 390
D3342 MA165
D15
A15
D14
A14
D4
B15
ABL
12V
GND
NON SIGNAL
R (TV)
G (TV)
B (TV)
LIN/DIG
TV/RGB
EXT CONT
BRIGHTNESS
V PLS
H PLS
SC
MUTE
A26
G26
TO A26
H PLS
EXT CONT
COMB/TRAP
YPBPR H
GND
C5604 16V 47
C5605 0.01
12V
G1
F1
TO F1
GND
SYNC
G27
TO A27
A27
Y IN
SC
Y IN
GND
R-Y IN
B-Y IN
R-Y OUT
B-Y OUT
12V
SYNC
R3497 10K
R3346 22K
C3326 16V 33
R3362 100K
C3323 10V 220
C3344 0.01
RGB SUB CONT-RAST
R3393 5KB
SUB BRT
R3317 20KB
R3386 4.7K
R3392
Q3301 2SC3311AQR
R3363 680K
D3311 MA165
R3367 39K
R3366 100KB
R3351 100KB
L6500
D3373 MA165
D3375 MA165
JL
R3379 2.2K
D3326 MA4062M
D3324 MA4062M
D3325 MA4062M
R3343 4.7K
R3339 10KB
H6500
R3350
R3349 10KB
R3378 3.3K
D3369 MA165
D3370 MA165
D3359 MA165
JH
0.9
0.5
Q3305 2SC3311AQR
D2
TO A16
D3
L1
8.2
3.4
5.6
2.7
0

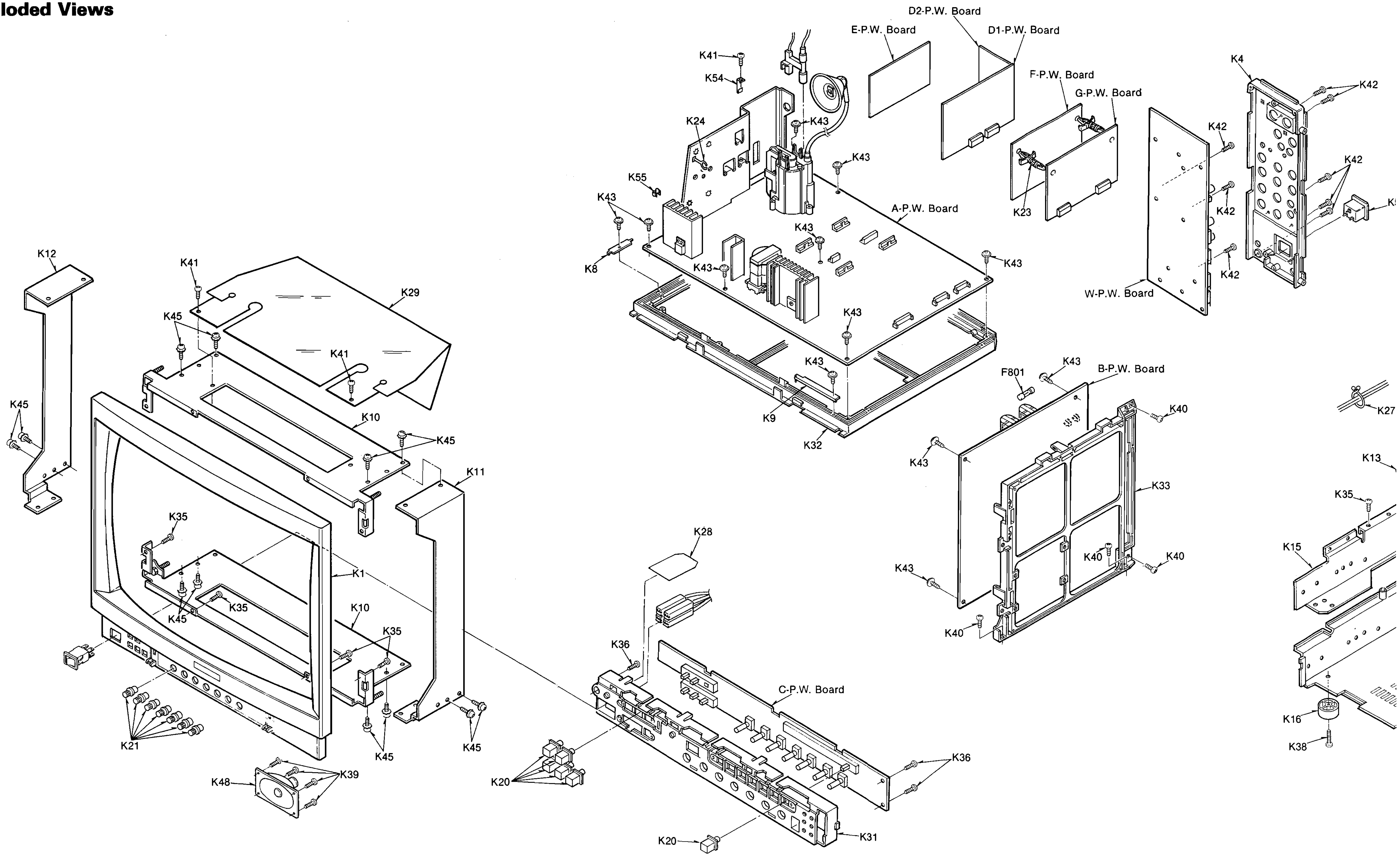
W-P.W. BOARD TNP111209AZ

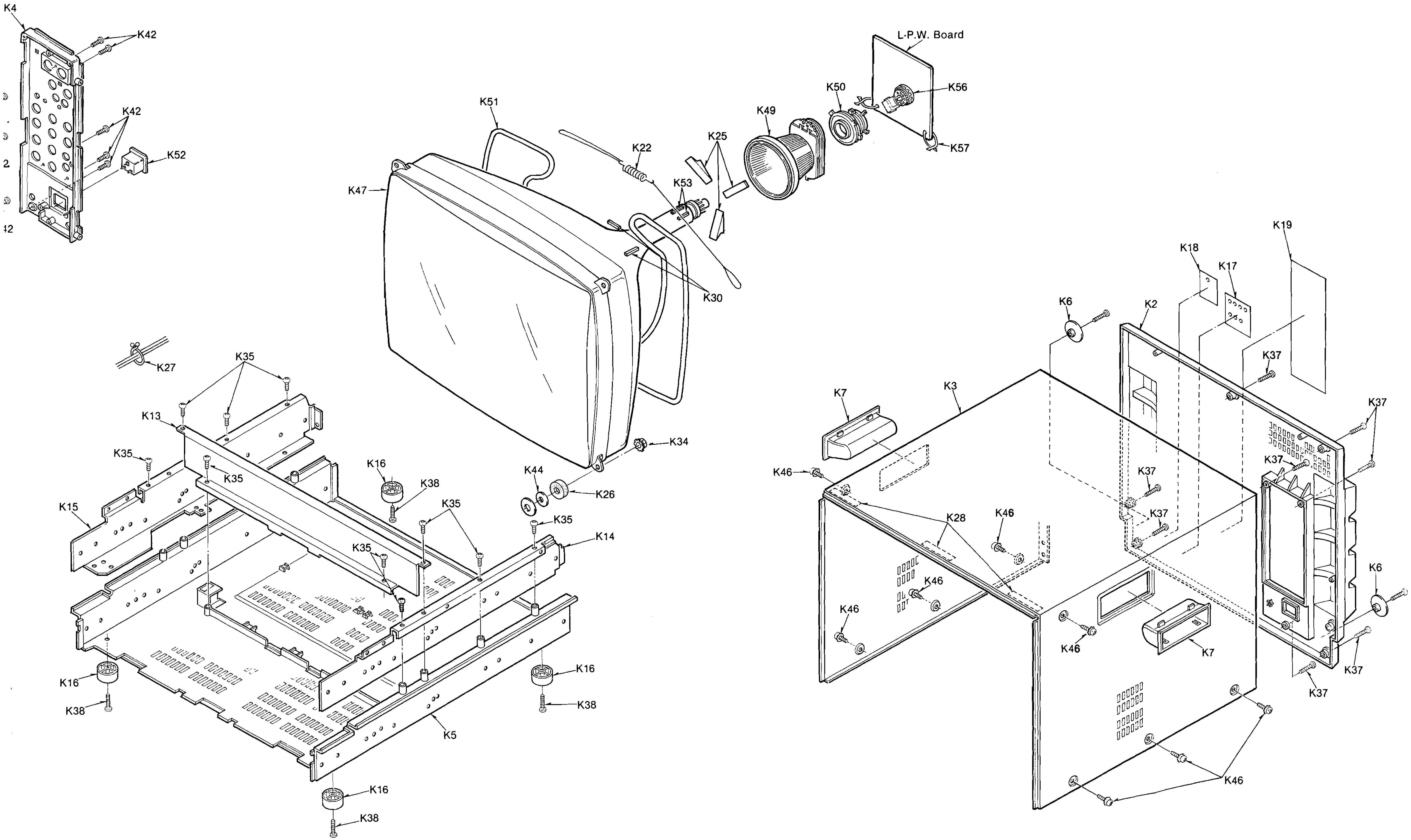

LINE A
LINE B
RGB
VIDEO
S-VIDEO
AUDIO
R
G
B
SYNC
R4301 75
R4302 75
R4303 75
R4304 75
R4341 75
R4343 75
R4345 75
R4346 75
R4340 100
R4342 100
C4310 16V 47
C4311 16V 47
R4347 15K
R4335 2.7K
R4336 2.7K
R4337 2.7K
R4357
R4352 33K
R4353 15K
D4310 MA165
D4311 MA165
Q4303 2SC3311AQR
Q4304 2SC3311AQR
Q4305 2SC3311AQR
R4361 33K
R4362 120
C4315 47P
R4363 100B
R4364 180
R4354 120
R4355 100B
C4314 47P
C4316 50V 0.22
C4317 50V 0.22
C4318 50V 0.22
R4359 180
R4360 220
D4312 MA165
R4365 15K
R4344 100
C4312 16V 47
R4356 180
R4351 6.8K
YS
L4301
0.2
0.5
0
-0.4
0.6
1.4
R4319 330
C4319 16V22
NP
Q4306 2SC3311-AQR
R4321 33K
D4320 MA165
R4320 15K
D4321 MA165
R4322 330
C4320 16V22
R4323 15K
D4322 MA165
R4324 33K
Q4307 2SC3311-AQR
Q4308 2SA1309AQR
R4325 3.3K
R4326 33K
D4324 MA165
R4349 1K
R4313 100
C4302 0.01
R4315 10K
D4308 MA4130H
D4307 MA4130H
D4316 MA165
R4314 10K
Q4301 2SC3311AQR
R4330 100
R4316 5.6K
R4334 470
R4329 100
R4318 390
R4201 1K
R4202 100K
R4208 1K
R4209 100K
D4319 MA165
D4318 MA165
C10
W10
SWITCH
GND
C4321 0.01
C4322 16V100
W2
TO B2
12V
GND
LINE A IN
SWITCH
GND
AUDIO A
W3
TO B3
LINE B IN
GND
GND
AUDIO B
W4
RGB SYNC
R2
R1
LA (L)
GND
RGB (L)
W1
SWITCH
GND
S-C IN
GND
S-Y IN
TO D5
W5
D5
GND
GND
COLOUR TEMP

L-P.W. BOARD TNP111210ZA


C360 250V 4.7
NH
C365 500V 0.01
D360 EU01N
R387 1K
1/2W
170V
D362 EU01N
R389 1K
D361 EU01N
R388 1K
TPL2
TO A18
L18
A18
170V
GND
TPL1
TJ81A5050
FOCUS
L10
C383 1000P 2KV
CRT
M48JBY02X
L6
GND
R372 8.2K 3W
R381 330
L354 39
172.9
117.5
Q357 2SC3063RL
126.5
D351 MA167
R375 88
D357 MA165
①
TPKR
D371 MA167
D374 MA700
130
125
Q363 2SA1698RL
0.7
R DET
R376 68
D352 MA167
0
116
Q360 2SA1698RL
126
R384 100
C357 100P
R393 180K
R369 8.2K
L351 56
C361 16V 10
NHE
C354 0.01
116
R366 100
8.2
Q354 2SC3942RL
8.1
R DRIVE
D368
R363 100
7.4
R351
2.1
Q351 2SC3311AQR
R354 1K
1.8
R396 150
C366 270P
C351 330P
R357 39
R380 120
R374 8.2K 3W
R383 330
L356 39
172.6
112.5
Q359 2SC3063RL
116
R377 88
D359 MA165
D355 MA167
②
TPKG
D373 MA167
D376 MA700
140
117
Q365 2SA1698RL
0.6
G DET
R379 68
D356 MA167
110.5
Q362 2SA1698RL
116
R386 100
C359 100P
R395 180K
R371 8.2K
L353 47
C356 0.01
111
R368 100
8.2
Q356 2SC3942RL
G DRIVE
D370
R365 100
7.4
R353
2.2
Q353 2SC3311AQR
R356 1K
1.9
R398 150
C368 330P
C353 470P
R359 10
R362 180
R373 8.2K 3W
R382 330
L355 39
172.8
120
Q358 2SC3063RL
135
R378 68
D358 MA165
D353 MA167
③
TPKB
D372 MA167
D375 MA700
160
135
Q364 2SA1698RL
1.0
B DET
R380 68
D354 MA167
0
118
Q361 2SA1698RL
136
R385 100
R394 180K
C358 100P
R370 8.2K
L352 47
C355 0.01
118
R367 100
8.2
Q355 2SC3942RL
8.1
B DRIVE
D369
R364 100
7.4
R352
2.2
Q352 2SC3311AQR
R355 1K
1.9
R397 150
C367 470P
C352 470P
R358 56
R361 22
A39
A39
L21
GND
TO D3
D3
L1
R342 100
R343 100
R341 100
B
G
R
GND
IB
IG
IR
9V
9V

Exploded Views


D2-P.W. Board
E-P.W. Board
D1-P.W. Board
F-P.W. Board
G-P.W. Board
K4
K42
K41
K54
K24
K43
K55
K8
A-P.W. Board
K23
W-P.W. Board
K12
K41
K29
K45
K10
K11
K9
K32
F801
B-P.W. Board
K40
K27
K33
K13
K35
K15
K28
K1
K36
C-P.W. Board
K16
K38
K21
K48
K39
K20
K31


K4
K42
K42
K52
K51
K47
K22
K53
K25
K49
K50
L-P.W. Board
K56
K57
K30
K27
K35
K13
K35
K35
K15
K16
K38
K35
K44
K26
K34
K35
K14
K35
K16
K38
K16
K38
K16
K38
K5
K19
K18
K17
K6
K2
K37
K7
K3
K37
K46
K37
K28
K46
K37
K37
K46
K46
K46
K7
K6
K37
K37
K46